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VIEWS, NEWS AND INTERVIEWS.

"Did you ever see a hay-seed electric car?" inquired Meekin, the lazy inventor. "Well, there are some in Brooklyn. Those Coney Island cars have recently come to town. They amble up to that new gold brick bridge and look around at the sights in a kind of a scared way, for all the world like a country Reuben. It's a strange sight—but you can ride from the bridge to Coney Island for five cents now."

The bill providing for inflicting the death penalty by means of electricity passed the Ohio House on April 9. The law becomes effective on July 1.

Mr. Juan Abella, director-general of public lighting for the municipality of Buenos Ayres, South America, is visiting the United States to secure data on our central station plants and systems. Mr. Abella will visit the principal cities and electrical manufacturing establishments of the country. He is preparing to install a plant of 6,000 arc lights in Buenos Ayres.

It is reported that a broken needle, imbedded in the fleshy part of a woman's hand, was drawn out by a powerful electro-magnet, improvised at the electric light plant in Cherryfield, Me., the other day.

Even the most renowned writers have made queer blunders in their works. As an example, Schiller, the great German author, in his "Piccolomini," speaks of a "lightning conductor," though the time of the piece is at least 150 years before that invention.

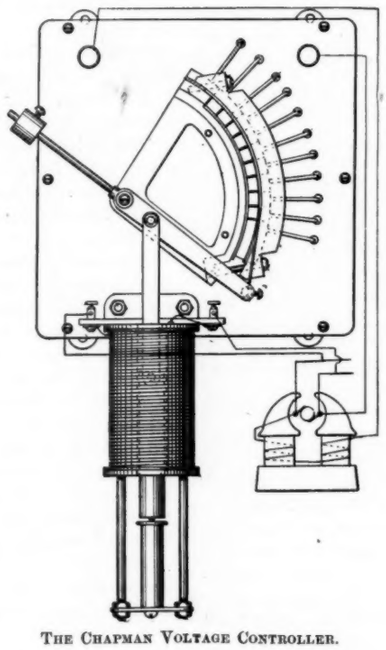
It is reported that a cash offer of over $2,000,000 has been made by a leading banking house, representing a foreign syndicate, for the privilege of running canal boats on the Erie Canal by electric traction. It is said that the offer will probably be accepted, and that the exact sum will be very close to $2,250,000. The exclusive franchise for electric traction on the Erie Canal belongs to the Cataract General Electric Company.

The new Detroit Railway plant, which is considered the most modern of any in the world, is costing only $80 a day to operate and is now running 75 cars, according to the statement of a prominent electrical manufacturer who is in a position to know. This includes salaries, coal, and all daily expenses. It is also said that the current has not been off the wires in five months. The plant is about 3,000 horse-power at the present time, and when the three new generators which the Walker Manufacturing Company are constructing are in place early in the Spring, it will be increased to 7,000 horse-power.

Hon. J. D. Reid, United States Consul at Dunfermline, Scotland, recently celebrated his 77th birthday on the local golf course, playing 29 holes in a three-ball match. Mr. Reid is one of the best known among the old-time and military telegraphers, and is often called the Grand Old Man of the telegraph.

The Chapman Voltage Controller.

The Belknap Motor Company, of Portland, Me., has put on the market a voltage controller, which is shown in the accompanying illustration, and which is reported to be meeting with unqualified success both on account of its effectiveness and its extreme simplicity. The invention originated with W. H. Chapman, the company's electrician, in connection with a lighting plant operated by water power at Bar Mills, Me. The water-wheel had no governor, and the changes of load were such as to cause the speed at the dynamo to vary from 900 to 1,400 revolutions per minute when no change was made at the water-wheel gate. The regulator shown herewith was devised and applied with perfect success, and, in spite of these extreme variations of speed, the potential is kept within one and one-half volt of the required point on the 110-volt circuit. The device consists essentially of a field rheostat and a solenoid to operate it. The resistance coils are mounted on mica-covered pipes placed inside of an iron box with a slate front. On the front of the box is mounted a series of contact segments connected to the resistance coils and arranged in the arc of a circle, at the center of which is pivoted a lever. One arm of the lever carries a stud and contact brush that moves over the peripheral surface of the segments. The other arm of the lever carries an adjustable weight by which the voltage may be adjusted to any desired point, and the regulator will then keep it at that point. The resistance is connected into the shunt-field circuit and the contact brush short circuits more or less of it, according to its position. The solenoid that operates the lever arm is built large, so as to make the friction of the moving parts enter as a small factor of the total power of the solenoid, and the solenoid and its core are of such proportions that the lifting force through a range of a couple of inches is almost exactly constant. A solenoid constructed to expend 55 watts of energy is found to operate this style of rheostat on changes of two per cent in voltage, and larger solenoids operate with greater accuracy. The solenoid is connected as a shunt to the armature circuit and may be connected to the potential wires that lead to some distant point of the system, and the apparatus then makes allowance for the loss in the line, and secures all the benefits of an overcompounded generator run at absolutely steady speed, even though it actually be attached to a plain shunt machine, and that machine be run at a speed varying 50 per cent or more. This method of regulating is claimed to be not only adapted as a perfect supplement to the compound winding, but is adapted to entirely displace it.



THE CHAPMAN VOLTAGE CONTROLLER.

Electric Light Plant Burned.

One of the electric light plants at the Grand Central Station, New York city, was burned on April 9, entailing a loss of $1,000. A boiler arch collasped and the flames ascended to the roof, setting fire to the building.

ELECTRICITY AND WATER POWER.

BY MARK A. REPLOGLE.

PREFACE.

These articles are not designed as an engineering work, and it is not claimed that the principles set forth in them are identical with those of the most advanced thinkers.

To become conversant with any subject one must have conceptions or clear-cut mental pictures that he may depend upon and feel to be reliable and true; and since the forces we call "electricity" and "power" can not be seen except by mental vision, it follows that no two minds have the same conceptions, as no two minds are alike.

The suddenness of the advent of electrical appliances has prevented many who are perfectly able, but engaged in other pursuits, from acquiring a knowledge of the fundamental principles by which electrical phenomena are explained. The works of the engineers immediately plunge into the "meaningless" formulas of mathematics, which serve only to make these principles more mysterious.

The wish of the author is to put these principles into plain language, and in such a light that the busy man, the mechanic, and the beginner can form conceptions that will bear them out in reasoning or in making general calculations.

If he succeeds in dispelling the cloud of mystery that prevents many from seeing clearly the causes of various phenomena in the electrical and power world, so that even a few will be saved weeks and (as is his own case) months of perplexing difficulties, he will feel that his work has accomplished its purpose.

ELECTRICITY.

The material universe contains a never-varying quantity of electricity, and each atom of matter inherits by the laws of nature its share, depending somewhat on the nature of the matter itself. If every atom of matter contained its portion at any one time, no electrical phenomena could be seen or discerned at such time.

All motion of electrical force is regulated by the law of supply and demand. All motion in nature is the result of forces seeking rest, a running down hill, as it were, stopping when the forces are equalized and balanced. But the forces of nature are so intermingled and so overlap each other that, while one force is finding an equilibrium or state of rest, it disturbs other forces, which in turn seek rest, and disturb still other forces. Thus in nature comes all motion—that of the air, of steam, of the clouds, of the streams, the lightnings, and of the flow of electrical currents—and the work of the true student of nature is to find the relation that the forces bear to each other.

The field is infinite, and but few of the pebbles have been gathered.

Electricity is not and can not be manufactured, as some suppose, but can simply be put in motion through conductors or wires. Thus currents are created, but not electricity. The flow is the result of an electric vacuum at one end of the wire and a pressure at the other end, but the two ends of the wire in practice are attached to a battery or dynamo, as the case may be. The battery and dynamo are then nothing more than electrical pumps. The wires are pipes that are always full, because they are material, and of such a nature that the electricity can easily pass from atom to atom when put under pressure.

Some kinds of material have such an arrangement of their atoms that the electricity, even under great pressure, can not readily flow from atom to atom. Such materials are called insulators, and are used to keep electric currents within bounds; yet each atom of the insulating material contains its share, or will draw slowly from others until it does. Currents can be created in metallic circuits with less pressure, hence less power, than in other kinds of material.

There are, however, different degrees of resistance in the metals, and in commercial electricity the metal that will carry the most electricity for its cost in money is nearly always employed. Copper has this quality, hence it is used more than others. Iron has six times the resistance of copper—that is, it would take six pounds of iron to carry the same quantity of electricity a given distance that one pound of copper would; but one pound of copper wire costs less money than six pounds of iron wire; so copper is used.

WHAT IS ELECTRICITY?

This is the question that very naturally presents itself to the minds of those who see the phenomena, but up to the present no man knows, or, at least, no one has been able to put forth a theory that will satisfy our advanced thinkers. The man who satisfies the world as to what it is will have climbed to heights unreached by Newton or Bacon.

We have no sense that can directly detect it. We can see the effects of it, also hear, taste, feel, and smell effects of it, but the force itself can only become an entity as it appeals to us through our secondary or reasoning powers. A conception of this entity must be formed by each individual for himself, and his mental picture of it is a product of the facts placed before him and his imagination.

Electricity is probably a condition or property of matter, but the writer prefers to consider it in all its bearings and relations as a fluid or material—a highly elastic material—not affected by gravity or centrifugal force, and having no inertia or momentum.

It is so subtle that it pervades all material that appeals to our senses, but the ever-changing forces of nature in unwinding themselves shift it about, causing here a pressure and there a tendency to a vacuum, keeping quantities of it in motion all the time. Man has discovered how to put it in motion, and how to make it perform work in its efforts to find rest, and on these discoveries are based all of the electrical sciences.

Electricity in its natural condition is passive; it only becomes active when some exterior force is brought to bear upon it, and can only give out the amount of power or energy put into it; hence it is only the means of transforming energy from one point to another. There is and can be only one kind of electricity. The different names, such as "static," "frictional," "galvanic," "thermo," "dynamic," etc., have arisen through different men viewing electrical phenomena from different standpoints. The terms "positive" and "negative" are used, but are sometimes misleading to the beginner.

An atom of material is only positive when it contains more than its share of the fluid, for then it is trying to supply its neighbors with the surplus. If an atom does not contain its share, it is negative, and proceeds to draw from its neighbors, and does so until an equilibrium is established. Positive indicates a surplus, or pressure, and negative an absence, or vacuum.

CONDUCTORS.

Electricity is governed in its flow by well known laws. A river will sometimes run many miles around a mountain rather than run one mile through it. The reason is that the mountain is composed of material that it can not readily pass through, yet, if it came to the mountain with such force that the earth and rocks would give way before it, it would pass through. The same law always holds good in electric currents.

Gravity is the force that causes the river to flow from the mountain tops to the ocean. The battery and dynamo in like manner force the fluid through the wires.

The air and other insulating materials are the impenetrable mountains and the wires are the valleys. Electricity, then, always takes the course of the least resistance, no matter how far around it is, and in case of a battery or dynamo, the same electricity goes around and around through the pumps as long as there is a vacuum at one side and a pressure at the other. The quantity depends on the pressure and the resistance or holding-back power of the wire.

The writer expects to be criticised on his views of the elasticity of the electric fluid; but scientists have clearly shown us that, as in the case of the Leyden jar, the fluid can be drawn from one piece of material and deposited in another, and what is left is equally distributed throughout, yet they claim that it has no elasticity; but, as it has no inertia, its action in all cases is the same as that of material that is inelastic. The obstruction or resistance of the wire to the passing current causes heat, the same as would be caused by any material passing through other material.

TABLE OF CONDUCTIVITY.

The conductivity of metals is determined by their inherent or natural resistance to electric current. The amount of current that will flow under a given pressure depends entirely on the specific resistance of the material through which the current is to flow; and a change in temperature changes the resistance in various materials. To be exact, in speaking of resistance, the temperature should always be known.

The following table will give a general idea of the conductivity of some of the common metals at a temperature of zero, Centigrade thermometer. Silver having the highest conductivity, is rated 100. Impurities also change the conductivity, and in the table the metals are supposed to be pure:

Silver	100.
Copper	99.9
Gold	80.
Platinum	18.0
Iron	16.8
Tin	13.1
Sodium	37.4
Aluminum	34.
Zinc	29.4
Cadmium	23.7
Brass	22.
Potassium	20.8
Lead	8.3
German silver	7.7
Antimony	4.6
Mercury	1.6
Bismuth	1.2
Graphite	0.07

NOTE.—Glass is called an insulator, and compared in the same way would rank at about 0.000000(00000000157.

It will be noticed that aluminum will conduct about one-third as readily as copper, also brass about one-fourth, iron about one-sixth and German silver about one-thirteenth as readily as copper. Glass conducts so poorly that it can be used where the electrician wishes to prevent a flow of current. Other common insulators are rubber, paper, fiber, gutta-percha, wood, wax, cloth, etc.

(To be continued.)

Storage Battery Litigation.

A decree was entered by Judge Colt in the United States Circuit Court at Boston, on April 8, sustaining the validity of the Brush storage battery patent, owned by the Electric Storage Battery Company, of Philadelphia, and granting a perpetual injunction against the Hopedale Electric Company and the Milford & Hopedale Street Railway Company. This controversy has been long pending, and was first decided by Judge Colt in 1893, when he granted a preliminary injunction, which he now makes perpetual.

The Electric Potential.

The Electric Potential Club, of Boston, will hold its next meeting at the Hotel Thorndike, April 22, dinner at 6.30 sharp. It has been voted to make this a ladies' night, and Prof. Elihu Thomson will deliver an address on the X rays with illustrations. Guests receiving invitations should reply at once, using the return postal, as the seats in the dining hall are limited in number, and provision will only be made for those whose answers have been received the day previous to the date of the meeting.

TELEPHONE NEWS AND COMMENT.

Telephone rates in Grand Rapids, Mich., have been reduced to $20 for residences and $25 to $30 for business houses.

Commissioner of Corporations Endicott has ruled that 200 shall be the price of the 21,500 shares of new American Bell Telephone Company stock, which is to be offered to stockholders before sale by auction.

Mr. Geo. H. Almon informs the ELECTRICAL REVIEW that franchises for telephone exchanges have been granted to him at Barre and Waterbury, Vt., and that he expects to get another in Montpelier, Vt., at the next meeting of the City Council. Barre is a city of 10,000 inhabitants, about five miles from Montpelier.

The largest instrument contract ever placed by an independent telephone company has just been let by the Citizens' Telephone Company, of Grand Rapids, Mich., to the American Electric Telephone Company, of Kokomo, Ind. The contract amounts to $35,000 and calls for 1,800 telephones. It was secured by General Manager P. C. Burns and Special Agent S. J. Bear, of the American company, after sharp competition. The same company will supply the switchboard equipment. The first lot of telephones has already been shipped, and it is expected that the exchange will be in operation in a few days. The Citizens' Telephone Company is reported to have secured 1,500 subscribers in Grand Rapids, and it is expected that they will all be supplied with telephone service by May 1.

Mr. Waring Withdraws His Suit.

Mr. R. S. Waring, formerly prominently and actively connected with the Standard Underground Cable Company, and the original owner of many of its valuable patents, recently entered suit against Mr. George Westinghouse, Jr., to recover the value of 10,000 shares of stock in that company. The well known names of the litigants and the large amount involved made the case one of considerable interest. The case was brought to a sudden termination on April 9, when the plaintiff withdrew his suit. The testimony on the main issue, viz., whether Mr. Westinghouse should account to Mr. Waring for the stock in question, was largely in favor of Mr. Westinghouse, up to the time the suit was withdrawn.

FIG. 1.—THOMSON POCKET AMMETER.

General Electric Company's Pocket Instruments.

The introduction by the General Electric Company of the new measuring and testing instruments for alternating current work (described in the ELECTRICAL REVIEW for March 25, 1896) has been followed by a development no less valuable along similar lines, and a set of ammeters and voltmeters has been especially designed for carriage in the side pocket of an ordinary coat. They are known as the Thomson pocket ammeter and pocket voltmeter, and as the first-named measuring instruments gave to the electrician absolutely reliable standard measurements at a price within his reach, so these pocket instruments give to the isolated plant engineer, the manager of the small central station, and the working electrician a cheap and reliable instrument, which may be carried in the pocket and exposed to comparatively rough usage without fear of impairment of accuracy.

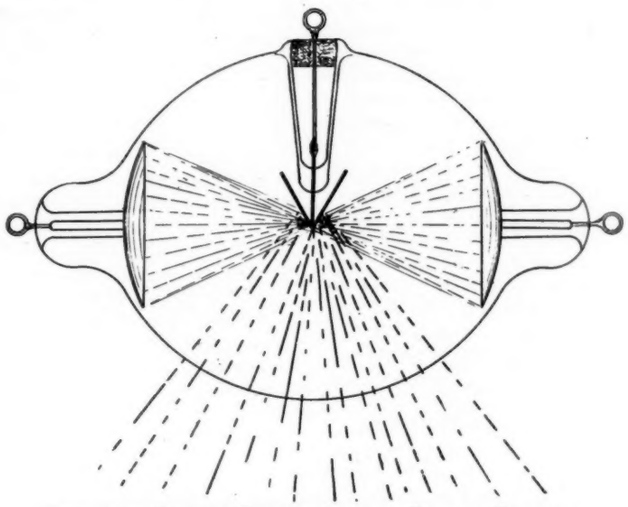
The construction of these pocket instruments, while suited to meet the different usage to which they are likely to be subjected, is similar in principle to that of the standard instruments. They are oval in shape, four and one-half inches by three and one-half inches. Notwithstanding the singular compactness of the pocket instruments, the scales are unusually long and clear. They are completely incased by a polished nickel cover. The ammeters are calibrated to read 2, 10, 25 amperes; the voltmeter from 0 to 75 and 150 amperes.

The three-cent street railway fare bill was moved to a third reading in the New York State Assembly on April 6.

PROPOSED STANDARD TUBE FOR PRODUCING ROENTGEN RAYS.

BY ELIHU THOMSON.

The observations which have up to this time been made as to the source of Roentgen rays point to the fact that the cathode rays must strike some surface, which then becomes the Roentgen ray source. My own observations make me think that, if the bombarded surface is of such a dense metal as platinum—which does not fluoresce—the rays will be more energetic. Bearing in mind these observations and the fact that it is desirable to possess Crookes tubes which are of Standard make and adapted for use with high-frequency apparatus, Ruhmkorff coils with oscillatory or uni-directional discharge, or with Wimshurst or Holtz machines, I have proposed as a standard tube one which is represented in the accompanying illustration. The structure consists of a bulb, at opposite sides of which are mounted concave aluminum disks supported on wires sealed through the glass. The foci of these concave electrodes coincide, nearly, at the center of the bulb, at which point is located a V-shaped sheet of platinum, iron, a small piece of iridium, or other piece of metal. This could be supported in any way desired, but it may be suggested, as a convenience, that it be mounted on a third or middle terminal, so that it can be made an anode. In using this tube with high frequency currents the two cup-shaped terminals are attached to the source of electric currents, which alternately become cathode during the discharges and cause the Roentgen rays to be emitted from the apex of the platinum sheet, or from the surface of the piece of metal placed at the common focus. With oscillatory currents from a Ruhmkorff coil the same connections may be used, and even when the discharges are uni-directional the connection of either cup-shaped terminal as a cathode makes the tube effective, but in this case the middle terminal may be made the anode and the other or cup-shaped terminal a double cathode, and thus give the greatest amount of cathode surface with but a short distance to be traversed by the discharges, while the sharpness of the focus and, consequently, the definition obtainable with the Roentgen rays remains unimpaired. If the vacuum in such a tube is too low, it is also possible to raise it quickly by constituting the middle terminal a cathode for a time, in which case metal would be carried therefrom and deposited on the side of the bulb in a very fine state of subdivision and quickly absorb the residual gas. If during the working of the tube the vacuum becomes too high, it can sometimes be reduced by simply heating the tube to a high temperature.



PROF. ELIHU THOMSON'S PROPOSED STANDARD TUBE FOR PRODUCING ROENTGEN RAYS.

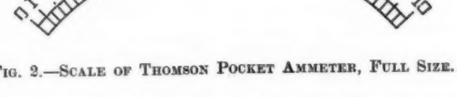


FIG. 2.—SCALE OF THOMSON POCKET AMMETER, FULL SIZE.

Electricity in the Textile Industries.

The use of electricity in Textile industries is rapidly widening, as its adoption is found to give to textile machinery the perfect regulation so essential to high-grade production. One of the most recent installations has been made in the mills of W. J. Dickey & Son, Baltimore, Md., by the General Electric Company. The electricity is generated by two 90-horse-power, moderate-speed generators, belted to a horizontal water-wheel. The current is transmitted about 200 feet to the third story of a woolen mill, where it will be used to operate motors and furnish light. In this third story thirty-six 60-inch woolen cards and four mules are to be placed, the cards being arranged in three rows, 13 to a row, with a line of shafting to operate each row. The motors will be placed either on top of the roof beams or be suspended from the same beams by iron slings, and will be connected to the line-shaft by a belt. Two of these line-shafts will be operated by two 25-horse-power, slow-speed motors. For the operation of the mules a 20-horse-power, moderate-speed motor will be connected to the shafting.

Electricity in Shoe Factories.

The operation of shoe factories by electricity seems to be making steady headway. A few weeks ago the ELECTRICAL REVIEW noted the equipment of the large Drew-Selby plant in Ohio with electric motors throughout by the General Electric Company. The same company is about to undertake the electrical equipment of the Norway Shoe Shop Company, of Norway, Me. Seven non-synchronous multiphase motors, aggregating 100 horse-power, will be put in. The current will be taken from the 250-kilowatt, three-phase generator recently set up in its station by the Norway Electric Light Company.

A NEW METHOD OF STUDYING THE LIGHT OF ALTERNATING ARC LAMPS.

READ BEFORE THE AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, NEW YORK, MARCH 25, 1896, BY WILLIAM L. PUFFER.

When a direct current of proper volume is caused to pass between the tips of suitable carbons, there is produced the phenomenon called the arc light. Generally the direction of the current flow is such that the upper carbon is the positive, and the lower the negative electrode. In order to produce a quiet and steady arc, the positive carbon may have a soft central core to aid in the formation of the crater from which the greater part of the light is emitted. The negative carbon may be cored or solid.

If we examine this arc light very carefully through dark glass, either smoked or colored, or, better still, project an image of the arc on a white screen in a darkened room, using a good achromatic lens of large aperture and moderately long focus, we shall see pictured out a beautiful but inverted image of the arc in correct colors and intensities.

Knowing the direction of the current we notice that the positive carbon has a very sharply defined crater of dazzling whiteness of about one-fifth or one-fourth the diameter of the carbon itself. From the crater the somewhat rounded point of the carbon diminishes in brightness and finally verges into the dark unchanged carbon. Upon this heated carbon point the evidence of combustion is plainly seen in the shape of changing surface and falling or accumulating ashes or secoriæ, while about it may be seen the flames of the burning carbon. The appearance of the negative carbon is quite different and clearly characteristic. The point is sharper, often with a little tip at the extreme end, while its base has a sort of crown or wall of ashes. The little tip is of whiteness equal to that of the crater of the positive, but very small, indeed. Below this tip is the hot-pointed carbon which, however, is not nearly as hot as the positive.

In the space between the two carbons is the bluish-violet light of the incandescent vapor in the path of the current. This is the arc itself, relatively non-luminous and in volume conical. The base of this blue cone is as large as, and is in contact with, the crater, while the apex just touches the white tip of the negative carbon. Surrounding this core are several layers of gases of various shades of blue and yellow, and the flames of the burning carbon. The light thrown out by this combination of causes may be considered as coming from four sources: By far the greater part from the white hot surface of the crater on the positive carbon, a much less amount from the little white tip of the negative, less than this from the carbons considered simply as two red hot sticks, and a very small amount from the hot gases. It is evident that a large part of the total light will be thrown downwards.

Upon stopping the current the heated carbons glow for some time. The positive is, however, very much hotter than the negative and keeps hot longer.

If, after the carbons have become cool, an alternating current is caused to pass between them, and sufficient time allowed for the points to become settled into their normal shape, it will be seen that the arc is naturally different in appearance from the direct-current arc. Both carbons will be of the same shape, having rounded points, each with a small luminous crater, from which is emitted the greater part of the total light of the arc. Both carbons will show similar signs of combustion, with the accompanying flames and ashes, and the light will be thrown upwards as well as downwards.

The blue arc between the two craters will appear as a band of nearly the same width in all parts, while about it are the several gaseous envelopes of different degrees of intensity. Upon shutting off the current both carbons will be found of the same degree of luminosity and heat.

Somewhat more than a year ago I wished to demonstrate to the senior class in electrical engineering, during a lecture I gave them on alternating current phenomena, that, although when examined by means of a large projected image upon a white screen in a darkened room, the alternating current arc appeared to be as steady as the direct current arc, and the light was thrown equally upwards as well as downwards, yet there were very great fluctuations in the light due to the intermittent heating of the carbon points.

The method chosen was the stroboscopic, which has given us, at the Institute of Technology, most excellent results in the hands of various experimenters while investigating the movement of transmitter electrodes, telephone diaphragms, tuning forks, vibrating strings, and the like.

A hand regulating arc lamp was placed in a lantern, with a large achromatic lens so adjusted as to make an image of the arc some 10 feet long on the screen of the lecture room. A transfer switch and suitable rheostats were arranged so that either a direct current or an alternating current of about 15 amperes could be used. At a convenient point a disk of about 18 inches in diameter, in which were cut eight narrow radial slots, was placed so that the beam of light was interrupted as the disk revolved. The disk was fixed to the shaft of a direct-current motor, whose speed could be adjusted very closely by a rheostat in the armature circuit.

As the alternator used was a 125-cycle dynamo, and the disk had eight slots, the stroboscopic effect would be produced when the light of the arc would be allowed to pass at a frequency very slightly more or less than that of the dynamo, or $\frac{125 \times 60}{8} = 937\frac{1}{2}$ revolutions per minute of the motor armature.

Suppose, for example, it ran at 937 revolutions per minute, then, counting from the time when the current in the arc was zero, each receding flash of light would be $\frac{1}{240}$ part of a complete alternation behind the preceding one, and owing to the persistency of vision the arc would be seen on the screen, as if the alternations had been so reduced in speed that it took two seconds for a single alternation of the current.

An attentive watching of the image as the current alternates is now highly interesting and instructive, and can only be seen to be fully appreciated.

It is clearly shown that the alternating current arc is a sequence of direct current arcs, alternating in polarity, and that each wave of current produces very clearly and distinctly all the attributes of the direct-current arc.

The hot positive carbon with its white hot crater, from which extends the fan-shaped blue light of the arc to the small white tip of the colder negative carbon, will be seen to die away, and all light goes out except the glow of the red-hot carbons, and then light appears again with the current reversed.

(To be continued.)

Look Out for This "Fleschen Trekker!"

A large machinery house in New York city recently received an order for over $3,000 worth of machinery from Joseph Antoon Boulboulle, Josephstraat, Rotterdam, Holland. Before filling the order they made a few inquiries, among others, of Mr. Lars S. Reque, United States consul at Rotterdam. Mr. Reque cabled the New York house not to send the goods, and followed this with a letter, in which he advised the house not to have any further dealings with Boulboulle. Mr. Reque, in another letter, says:

"I would add, in this connection, that I have lately had several inquiries in regard to the same party. It would seem that he is trying his swindling operations in every part of America. This country seems to be full of these swindlers — "fleschen trekkers"—that is, "cork-screws," as they call them here. If they are exposed, they simply commence to do crooked business again under a different name."

Electrical manufacturers should take warning from this experience and have a care as to how their export business is done.

A series of Crookes tubes are now being made by the New York & Ohio Company, of Warren, Ohio, which this company believes will be of considerable interest to electricians who are interested in radiography. The designs are based on suggestions furnished this company by a leading scientist. This company is now preparing for publication a new catalogue illustrating the Packard mogul incandescent lamps.

National Underground Cables in Toledo.

The National Underground Cable Company, of New York city, has just been awarded a contract by the Toledo Traction Company, Toledo, Ohio, for all the underground cables to be used by the latter company during the year 1896. This contract is one of the largest ever given out in the United States, and covers cables for several kinds of service, including railway feeder, electric light and power distribution, and when finished will be the only system in the world in which series arc circuits and the three-wire system will be distributed from the same station. The distribution will be done from one immense central station, and the sizes of cables to be used run from No. 6 Brown & Sharpe gauge to over 1,000,000 circular mils.

The contract of the National company covers also all the work of laying, jointing, connecting the cables, and the furnishing of all apparatus to be used in connection with the underground system.

The National Conduit Manufacturing Company, the associate company of the National Underground Cable Company, furnished all the underground conduits and built the complete subway system for the Toledo Traction Company.

As a result of its continually increasing business, the National Company's cable factories at Harrison, N. J., and conduit factories at Hasting-on-Hudson, N. Y., are compelled to run night and day to keep up with orders.

Prices of Electrical Stocks.

A comparative table of the prices of the leading electrical stocks, April 1, as compared with March 1, is appended. The changes in prices, as a rule, are for the better, although the movement has been rather narrow. The advance in Postal Telegraph from 82 to 86 reflects the declaration of the dividend of one per cent for the December 31 quarter. A better tone to Westinghouse securities is attributed to the patent pool. This was also the cause of the sharp advances in General Electric common and preferred.

	April 1.		March 1.	
TELEPHONE:	Bid.	Asked.	Bid.	Asked.
American Bell.....	208	205	208	208¼
Bell Telep. of Mo.....	175	200	175	200
Chicago Telep	160	....	160	....
Erie Teleg. & Telep....	59	61	60	61
Hudson River Telep....	49	50	45	48
Mexican Telep.....	70c.	75c.	70c.	75c.
New England.....	90	....	88	90
N. Y. & N. Jersey.....	123	128	128	130
TELEGRAPH:				
Am. Teleg. & Cable....	93	95	90	93
Cent. & S. Amer. Cable.	123	125	121	125
Commercial Cable.....	158	161½	153	....
Gold & Stock.....	107	....	105	107½
Mexican Teleg.....	192½	200	....	....
Postal Teleg. & Cable.	86	88	82	85
Western Union.....	83½	83¾	83	83⅛
ELECTRICAL:				
Boston Elec. Light....	107	108¼	....	....
Edison El. Ill., Boston.	135	140	130	140
" " " Brooklyn	99½	100⅝	100	101
" Co., Chicago...	117¾	118	....	119½
" El. Lt., Phila..	135	135½	....	135
" " Ill., New York	96	98¼	95	96
" Co., St. Louis	15	17	15	17
Ed. Lt. & P. Co., San Fran.	....	106	97½	98¼
Elec. Stor. Battery Com.	26½	....	....	28
" " " Pfd.	28	....	....	28½
Int. Con. & Insu.....	25	35	25	....
Penn. Heat., L. & P. Com.	10¼	10⅜	10	10¼
" " " " Pfd.	14⅝	15	10	10½
Westinghouse Com....	30	31	....	28¾
" 1st Pfd..	53¾	54	52	53
General Elec. Com,....	35⅞	35⅞	31	31¼
" " Pfd.	67	70	59	62

The A., B. and C. Electric Road, known as the "alphabet line," will cut down the running time between Cleveland and Akron.

THE HISTORY OF ELECTRIC HEATING APPLIED TO METALLURGY.

READ BEFORE THE WASHINGTON SECTION OF THE AMERICAN CHEMICAL SOCIETY BY FREDERIC P. DEWEY.

(Continued from page 161.)

In 1881 a United States patent, No. 236,478, was issued to Ball & Guest for an electrical carbonizing apparatus (Fig. 4) to produce carbons for the electric light. The articles to be carbonized are placed in a pile within a case and are surrounded by pulverized carbon. The case is then brought into the circuit and the contents thereby heated. A portion of the current passes through the carbon packing.

In 1881 an English patent, No. 304, was issued to Werderman for preparing carbon from sugar, which was then subjected in a mold to a white heat by the passage of the current, for use in electric lamps. In the same year silicon was to be heated by the current to prepare it for use in electric lamps, French patent, No. 144,317.

The Belgian patent, No. 144,387, of August 13, 1881, described a special form of furnace with one or more pairs of electrodes to be forced forward by springs. The furnace was calcined magnesia mixed with metallic oxides.

In the English patent, No. 3,757, of 1882, Werderman proposed to heat silicon under pressure by the passage of the current.

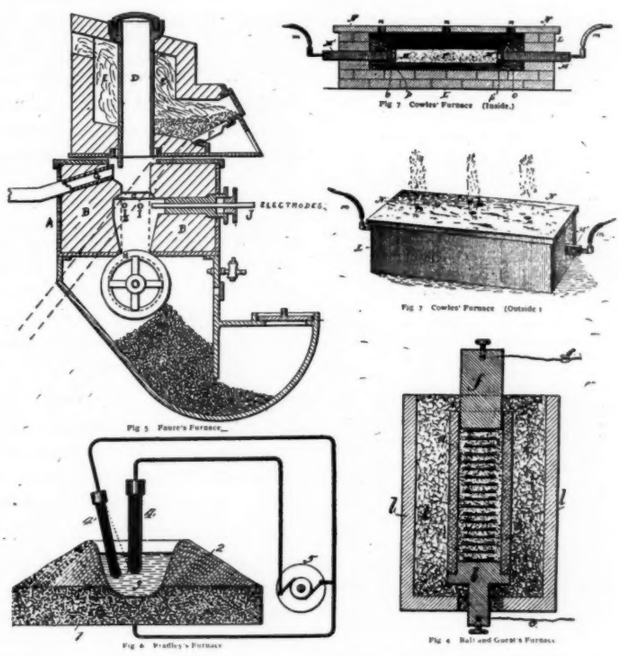
At the Washington meeting of the American Institute of Mining Engineers, in February, 1882, in discussing the paper of Mr. Keith on the application of electricity to mining and metallurgy, Mr. H. M. Howe briefly outlined a process which should have been developed into a successful, commercial process. He said: "The aluminous compound is placed in a carbon crucible, which is connected as the cathode of an electric current of great intensity. A voltaic arc is then thrown across from another electrode against this carbon crucible, the current thus first melting and then decomposing the aluminous compound, and metallic aluminum being deposited on the sides of the crucible."

In 1880–82–83–84 a series of patents was issued to M. C. A. Faure, which has attracted considerable attention; more, perhaps, from their suggestiveness than from their actual contents. As described in the English patent, No. 6,058, of 1882, the process was designed for the reduction of sodium, and the furnace (Fig. 5) consisted of a tube in which the charge was first heated by an external fire. It was then passed into a chamber provided with electrodes for the passage of the current, where it was intensely heated. Below was an automatic discharge for the refuse. There were also suitable condensing arrangements.

Chronologically considered, the United States patents to C. S. Bradley may be considered here, since the fundamental application was filed in February, 1883, although the patents were not issued for about nine years. In these three patents (Fig. 6) the claims are drawn to cover three points: Using an unfused portion of the charge itself to inclose and contain the bath of fused material. Using the current for the double purpose of fusing and decomposing the charge. Using a downwardly projecting blowpipe or other flame to supply a portion of the heat.

A United States patent, No, 282,964, was issued to Delaplaine, Hendrickson & Clamer in 1883 for melting the tin off from tin scrap by the current.

When, in 1885–86, the simple and beautiful process of Messrs. E. H. and A. H. Cowles was announced, both the scientific and practical


ELECTRODES
Fig 5 Faure's Furnace
Fig 6 Bradley's Furnace
Fig 7 Cowles' Furnace (Inside.)
Fig 7 Cowles' Furnace (Outside.)
Fig 4 Ball and Guest's Furnace

ELECTRIC FURNACES MENTIONED IN "THE HISTORY OF ELECTRIC HEATING APPLIED TO METALLURGY."

worlds were surprised and intensely interested, and a revolution in high heat metallurgy seemed imminent, particularly in the metallurgy of aluminum, but later developments have not fulfilled the early promises in general metallurgy, and aluminum metallurgy has now passed out of the field of high heats.

This process consists in mixing the ore to be reduced with a so-called resistance material (which, for practical reasons, was carbon) and then passing the current through. The current generated a very high heat and difficultly reducible oxides were reduced to metal. In the case of aluminum the reaction went a step farther, and the reduced metal combined with the carbon and formed a carbide of aluminum.

The generation of the heat was attributed to the passage of the current through the resistance material. This was not altogether so, but the high heat was generated by the passage of the current from particles of the charge to other particles—in other words, by dividing up the current into innumerable small arcs—and the great advantage of the process lies in evenly distributing the heat of a large arc through a considerable space, through which the material to be acted upon is distributed.

The furnace (Fig. 7) consisted of an outside case of brickwork, lined on the inside with carbon; then the charge containing the ore and carbon was put into the center in contact with the electrodes, the charge was covered with carbon and a perforated cover placed over all.

By this process silicon, potassium, sodium, magnesium, calcium, chromium,and titanium, as well as aluminum, were produced, but on account of so much of the aluminum combining with carbon it became necessary to introduce an alloying metal into the charge. This was usually copper or iron. By this process the price of aluminum in alloys was very largely reduced, but no considerable amount of the pure metal was ever produced.

In 1886 a United States patent, No. 335,499, was issued to Bradley and Crocker, in which the current was used to heat the charge, and was divided into two portions; one part passed through the walls of the retort and another passed through the charge.

(To be continued.)

A new dynamo brush, having an aluminum core, is now being made by the Kester Electric Manufacturing Company, Buffalo, N. Y. This aluminum core, with the self-lubricating and ventilating features, marks it as an innovation in dynamo brush-making. Mr. Kester, of this company, mentions that the three largest electrical companies have adopted its use and that, as an indication of the demands for it, the last order for gauze wire, of which it is made, amounted to nearly $1,000.

ELECTRIC LIGHT FLASHES.

Mr. F. J. Thrun, of Minocqua, Wis., informs the ELECTRICAL REVIEW that he will build a 500-light electric lighting plant this Spring and would like to receive catalogues and prices from manufacturers.

The Orient Electric Company, of Youngstown, Ohio, are looking toward a large demand the coming season for the Orient lamp. This company prides itself on the fact that they permit no Orient lamp to leave the factory until it has been thoroughly tested; thus they claim uniformity, efficiency, voltage, and candle-power.

The Electric Appliance Company has just completed the successful installation of an electric light and power plant in their own building at 242 Madison street, Chicago. The power is secured from a powerful gas engine, which also does the work of driving a large freight elevator. The plant is running nicely and producing a satisfactory light. The dynamo is splendidly assisted in accomplishing its results by the use of Paranite wire and Packard lamps. The switchboard is equipped with C. E. M. jack-knife switches and Whitney instruments.

Last week, while workmen were putting up a 60-foot smokestack for the Tully, N. Y., Electric Light Company, some of the tackle gave away and it fell to the ground and was broken in two. The next day another attempt was made to raise it, and while swinging it into position it was crowded against the gin pole so hard that it snapped the pole off about five feet from the top and the stack came down with a crash. About 25 feet of the base dropped down in front of the boiler and the rest went down outside, crushing the edge of the roof and breaking the upper part of the stack into two pieces as it struck the ground in the rear of the power house. Two men who were over the boiler directing its movements and setting it in position narrowly escaped injury.

Texas Street Railway Association.

The third annual meeting of the Texas Street Railway Association convened at Galveston, on March 18, 1896, with the president, W. H. Sinclair, in the chair. After an opening speech by the president the convention got down to business and discussed the questions of fares, employés, power, electrolysis, track repairs, overhead wires, insurance, car wheels, ties, litigation, and accidents, and methods of increasing revenue.

W. H. Sinclare, of Galveston, was elected president, and Carl F. Drake, of Austin, vice-president; C. L. Wakefield, of Dallas, secretary and treasurer. These, with A. H. Hayward, of Houston, and Geo. B. Hendricks, of Fort Worth, form a directory of five.

The next meeting will be held at Austin, on the third Wednesday in March, 1897.

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SPECIAL NOTICE TO ADVERTISERS.

CHANGES for advertisements must be in this office by Friday noon for the following week's issue. NEW ADVERTISEMENTS should be in the office not later than Saturday noon to insure publication the following week.

NEW YORK, APRIL 15, 1896.

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The recent troubles in South Africa have called attention to the fact that there is already under way a large amount of electrical construction work for the mining districts in that country. As an example, it is interesting to know that eight car loads of electric pumps were recently shipped by an American electric manufacturing company to South Africa, where they will be used in gold mines. In one case electric pumps, arranged in series, will lift water from the bottom of a shaft 2,500 feet deep.

From the present outlook the extent of electric street railway construction during 1896 will be extremely large. New roads connecting towns and cities are being projected in all the States of the Union.

Water-power owners are looking to electricity for the fullest development of their properties. We think they, as well as all manufacturers of water-power appliances, will find much to interest them in the series of articles by Mr. Mark A. Replogle, begun in this issue of the ELECTRICAL REVIEW.

It is understood that the genuine pioneer electrical journal of the United States will be exhibited at the National Electrical Exposition next month. It is said to be about 60 years old. The ELECTRICAL REVIEW, the oldest electrical weekly in America, welcomes this ancient specimen of early enterprise in the electrical field.

Colonel John A. Cockerill died suddenly of apoplexy at Cairo, Egypt, April 10. He was returning to New York from a year's stay in Japan, where he had won high journalistic and diplomatic honors as the correspondent of the New York *Herald*. Colonel Cockerill's death will be mourned in every newspaper office in the United States, where the abilities that made him one of the truly great journalists of the day have long been recognized. His generous, manly nature appealed to every acquaintance and won innumerable friendships in all branches of life. The editors of the ELECTRICAL REVIEW feel that in his death they have lost a friend whose place can not be filled.

It would be well if all publishers of electrical books would bear in mind that the electrical man is an unusually busy being, and therefore must snatch a few minutes in between whiles to do most of his reading. Why not, then, make books of a size that will fit easily into a coat pocket? This kind of book a man may carry with him, and, if it is inclosed in flexible covers, no harm is done to it. About five by seven and one-quarter inches should be the maximum limit of size. A certain series of electrical books has enjoyed a sale of over 45,000 copies, and we suspect that their small and handy form had a great deal to do with it. A man who is fond of books makes them his friends, and what is the use of being separated from a friend simply on account of a matter that should be easily adjusted?

THE FINANCIAL SIDE.

Wall street had another war scare this week, incident to the Cuban resolutions adopted by Congress favoring a recognition of the belligerency of the insurgents. It was short lived, however, and in the closing days prices of securities practically recovered losses sustained earlier in the week. The course of the market during the six days demonstrates that prices are on bed rock, that there is a strong undercurrent of support expected to come to the surface with the first signs of improvement in business and a movement of Congress towards adjournment, or more of a disposition on its part to mind its own sadly neglected business. Trade reports are not particularly encouraging, nor are they any more unfavorable than a week ago. The unchanged condition is due largely to a continuation of unfavorable weather. Some prices advanced and others declined. The volume of business in most lines is below the normal, as reflected by bank clearings, which are 20 per cent less than in 1893, although slightly in excess of 1895. The crisis has been passed in the commercial world, and with less failures, involving smaller liabilities, than was first thought probable. Commercial paper is easier by far. At one time it looked like regular gold exports, and $1,300,000 was sent to Germany on a special transaction. On Friday, exchange dropped one-half cent below the export point on the liquidation of speculative holdings.

The air is still charged with electrical rumors, growing out of the consolidation movements now on foot. They, of course, center around Westinghouse and General Electric. A very good authority tells me that the Fort Wayne negotiations are not likely to be brought to a head for some time, although hopes are entertained of eventually securing control of that property. Until this matter and others of a similar character are rounded up, it is safe to assume that there will be no definite step taken towards a consolidation of General Electric and Westinghouse.

I am willing to go on record with the prediction that these two great companies will be brought under one management and one capitalization before the end of 1896. They are practically one now, as far as business is concerned, but have two salary lists and pay rolls, while only one would be required. A consolidation is the logical and inevitable outcome.

The annual report of the General Electric Company ought to appear in about two weeks. The figures have been compiled and will be shortly submitted to the directors. If any one expects a much better showing than that of last year, they will be disappointed. The value of the company's securities lies rather in the prospects than present earnings. I am also told by an interest who speaks by the card that no attempt will be made in May, at the annual meeting, to correct the capital impairment. The matter is to be allowed to run on with a view of a partial self-adjust-

ment. Of course, no capital deal can be made with Westinghouse until all these matters are cleaned up. The stock in the week fluctuated between 37 and 38, and closed at 38½. The preferred gained 4 points in the week, closing at 75½. Talk of payment of the dividend arrears accompanied the appreciation. The debenture 5 per cent bonds sold at 90½ to 91.

The ELECTRICAL REVIEW called the turn on the personnel of the committee to control the patent pool. I am told that the fifth member has been appointed and that the announcement will be made within 10 days. The headquarters of the committee will undoubtedly be the Edison Building, 44 Broad street, New York.

Of the inactive securities Edison Electric Illuminating of New York sold from 97½ to 98⅞. The old bonds sold from 106¾ to 107. American Telegraph and Cable sold in fractional lots at 93½ to 94½.

The Edison Electric Illuminating Company of Brooklyn listed $150,000 of its first mortgage 5 per cent bonds on the New York Stock Exchange this week, making the total outstanding $1,000,000.

American Bell Telephone fluctuated around 202, closing at that figure. The Massachusetts Commission of Corporations has authorized the sale of 2,100 shares of its new stock at $200 per share.

The New York & Pennsylvania Telephone and Telegraph Company has declared a quarterly dividend of 1½ per cent, payable April 15.

New England Telephone was advanced 2 points in Boston to 91. Erie Telephone was quite active in the latter days of the week, declining from 60 to 58½. On Saturday there was a partial recovery. Electric Storage Battery stocks in Philadelphia were strong. The common advanced 1¾ to 31¾, and the preferred 2¾ to 32¾. The company this week closed a large contract with a Hartford concern.

BAIN.

New York, April 11.

GENERAL NOTES.

A committee of the Erie Telegraph and Telephone Company will recommend a further extension of the long-distance service by the construction of 3,000 miles of wire in Minnesota and the eastern section of North and South Dakota.

The many friends of Mr. Wm. S. Beatty, of the Pittsburgh office of the General Electric Company, will be pained to learn of his death, April 7, in New Orleans. Mr. Beatty was a comparatively young man for the position he filled and had marked abilities which gave great promise for a brilliant future.

The New York State Railroad Commissioners have granted authority to the Albany, Helderberg and Schoharie Electric Railway Company to build a road from Albany to Schoharie, a distance of 30 miles. This road will pass through a fertile and thickly populated territory that is far removed from any railroad. John W. Van Valkenburgh, of Albany, is president of the company.

EXPOSITION NOTES.

FROM NIAGARA TO NIAGARA IN NEW YORK CITY.

The completion of the electric power plant at Niagara and the recent contract made by the city of Buffalo for its delivery within the city limits by June, 1897, make it appropriate that the work should be signalized in some way at the National Electrical Exposition in May. With this end in view, Mr. T. C. Martin has succeeded in perfecting arrangements for its complete carrying out—has secured for the exposition a beautiful model of the Niagara River, the power house, the town, and the long discharge tunnel, made to scale by Mr. C. R. Allen, of Philadelphia, under the direction of Dr. Coleman Sellers, for the Hon. Peter A. Porter, of Niagara. The turbines are seen in actual play, operated by water from the canal, and driving the big generators. The model is 12 feet by 4, and will be given a place of honor on the main floor. The happy thought has occurred that, as little power is required to drive the turbines, it might be comparatively easy to switch on a modicum of current from the Falls plant and actually run the model with it; not as an ideal exemplification of what might be done, but more as a pretty *tour de force*. To get the circuit was the problem, but General Eckert, president of the Western Union Telegraph Company, has authorized Mr. A. S. Brown, the electrical engineer of the company, to place two of their ordinary copper commercial wires at the disposal of the exposition for use every evening, say, for an hour or so, when the weather conditions are normal. This is a generous offer, evincing no small amount of public spirit, and does great credit to the company. Mr. L. B. Stillwell, of the Westinghouse company, has been asked to co-operate with Mr. Brown in working out the details, it being the intention to use the Tesla two-phase system and Tesla two-phase apparatus. A further suggestion is to hang some American Bell long-distance telephones over the exhibit and thus listen to the roar of Niagara while seeing the model driven by it. Steps are now being taken to realize this. Yet another really brilliant idea, quite likely to be executed, is that of Mr. Stillwell to deliver some of the Niagara current to condensers and cable to Europe with it. Mr. Tesla is greatly interested in the whole project and is lending it his active assistance.

The Electric Storage Battery Company, of Philadelphia, will make an interesting exhibit, but have not yet completed their plans for it.

The New Britain Machine Company, of New Britain, Ct., will exhibit an eight-horse-power Case engine direct connected to a Riker dynamo.

Mr. T. C. Martin, chairman of the Historical and Loan Exhibit, advises us that Mr. Edison's personal exhibit for the historical section, consisting of 40 cases, has been received at the exposition building.

R. B. Corey, of New York city, will exhibit alternating and direct current and constant potential arc lamps, knife switches, and Sun-Schmelzer-Nurnberg carbons for direct and alternating currents.

The Standard Paint Company, of New York city, will make an attractive display of the well known "P. & B." goods and a line of carbons. Representatives of the firm will be in constant attendance; among these will be Messrs. J. N. Richards, F. F. Vandewater, and H. W. Benedict.

The Fort Wayne Electric Corporation, of Fort Wayne, Ind., intend to exhibit single-phase, alternating current motors of several sizes and direct connected, direct current apparatus. Col. H. C. Adams, the New York representative of the company, will have general charge of the exhibit and there will be a man in direct charge of each department.

The Ball & Wood Company, of New York city, will exhibit a 16½x14-inch Ball & Wood engine of latest design, direct connected to a Siemens & Halske 100-kilowatt multipolar generator, nominal speed 250 revolutions per minute. This engine is one of eight, which the company will later install in the new Siegel-Cooper Building, at Sixth avenue, Eighteenth and Nineteenth streets, New York city.

A. K. Warren & Company, 465 Greenwich street, New York city, will make an exhibit at the forthcoming electrical exposition. They will show their method of doing general repair work, the class of materials used and the machine used for turning down and smoothing rough commutators. They will also exhibit their brass alloy woven wire brushes and a new brush-holder which they have lately perfected.

The Anchor Electric Company, of Boston, will make an exhibit of their full line of specialties, including switches, sockets, cut-outs, watch-clocks, and gongs. They will also have on display a new advertising specialty, which they expect will attract considerable attention. Messrs. Hawks, Marshall, and Reynolds, officers of the company, will probably spend two or three days at the convention, and Mr. Field, the company's New York representative, will be there most of the time.

The Metropolitan Telephone and Telegraph Company, of New York city, will establish in the exposition hall a public station for the convenience of exhibitors and the general public. This will probably be equipped with several booths and telephones, with a suitable switching arrangement, and perhaps a few sub-stations in the spaces allotted to individual exhibitors. The entire arrangement will be in charge of the company's contract agent, who will, from time to time, assign representatives for duty.

Wendell & MacDuffie, of New York, general eastern agents for the Warren Electric Company, of Chicago, will exhibit a 45-kilowatt and a 60-kilowatt, single or two-phase multivoltage Warren dynamo, to operate two circuits at different potentials at the same time. In connection with their exhibit the Diamond Electric Company will have a bank of their new type Scheefer transformers and meters. Messrs. C. C. Warren, A. M. Searles, H. J. Medbury, H. P. Hill, Jacob Wendell, Jr., and R. L. MacDuffie will be present at the exposition.

The Carpenter Enamel Rheostat Company, of Hoboken, N. J., will show various types and sizes of field regulators, theater dimmers, motor starters, motor regulators, reversing controllers for electric cranes, elevators, and similar service; automatic rheostats opening both from failure of current and upon overload; special rheostats in a variety of forms; a full line of electrically heated tools, such as soldering irons, for all voltages from 50 to 500; a similar line of flat irons, curling iron heaters, and other types of electrically heated appliances. President H. Ward Leonard and Vice-President Charles E. Carpenter will be present at the exposition from time to time.

General E. S. Greeley has kindly consented to loan, for the purpose of opening the National Electrical Exposition, the gold telegraph key used by President Cleveland at the World's Fair, in 1893. It is proposed that when Governor Morton closes the circuit through the key to the power plant, instead of signaling merely from floor to floor of the exposition building, a circuit shall first be made across the continent and back, through Chicago and San Francisco. The action will practically not be less instantaneous, but it will graphically illustrate the speed with which electricity travels. It is proposed, also, to fire a signal cannon in the same way, at the same time, to announce the event.

The Bishop Gutta-Percha Company, of New York city, expect to exhibit an extensive assortment of wires and cables insulated with rubber, for electric light and power, for inside and outside wiring, and also for underground, overhead, and submarine use. They will show a large assortment of submarine telegraph cables insulated with gutta-percha, india rubber and gutta-percha in their crude states and in several stages of preparation, gutta-percha wires used in blowing up the rocks in Hell Gate, wires for torpedo cables, Marks compound wires for gravity batteries, balata flexible cords for lamps and fixtures, samples of cables used in lighting the World's Fair buoys in Lake Michigan, and samples of copper armored cables used for alternating currents under water. Specimens of special elevator cables made with flexible steel sustaining cords for use in high buildings will also be shown.

ELECTRIC RAILWAY NOTES.

An underground electric street railway system was recently tested in Springfield, Ohio, and reported to be a success. Krotz is the inventor's name.

In a recent suit at Syracuse, N. Y., it was decided that receivers were liable for damages resulting from accidents on street railways in their charge.

The New England Street Railway has declared a quarterly dividend of one per cent and an extra dividend of one-quarter per cent, payable on April 15.

The New Orleans Traction Railroad reports gross earnings for February of $115,325, an increase of $27,814 as compared with the same month of last year, and net, $56,069, an increase of $21,694.

The electric roads of Brooklyn should have the same right on the bridge that may be granted the elevated. There is not a single technical objection, and many thousands more passengers would be accommodated.

A new corporation, known as the Yonkers Railroad Company, Yonkers, N. Y., has consolidated several of the roads running out of that city. Albert L. Johnson and R. T. Wilson, Jr., are the prime movers in the deal.

The Kings County Traction Company has been incorporated to take the place of the Brooklyn, N. Y., Traction Company. The incorporators are P. F. Vaughan and J. H. Lockinan, of Brooklyn; Emil Carleback, J. A. Snyder, and George H. Levy, of New York city.

The Nassau Electric Railroad Company, of Brooklyn, N. Y., has taken formal charge of the offices and business of the Atlantic Avenue Railroad Company, of Brooklyn. It is understood that the entire official and clerical staff will be replaced by representatives of the Nassau company.

The Consolidated Traction Company, of Pittsburgh, Pa., last week took possession of the various lines leased by it several months ago. These include the Pittsburgh, Duquesne, Central, Allegheny, Citizens', and Fort Pitt Traction companies. It is estimated that it will cost $4,000,000 to rehabilitate the lines.

Twin City Rapid Transit Company, of Minneapolis and St. Paul, report the following: Gross earnings, February, 1896, $145,060; ditto, 1895, $134,895; increase, $10,165; operating expenses, February, 1896, $69,382; ditto, 1895, $67,947; increase, $1,435; net earnings, February, 1896, $75,677; ditto, 1895, $66,948; increase, $8,729.

Henry A. Everett, of the Cleveland, Painesville & Eastern road, said that the Lake Shore & Michigan Southern road would probably not reduce rates to meet the electric competition to Willoughby, as the electric cars would be so much more convenient as to attract people, even if the steam road should meet the rate. The C., P. & E. will be open to Willoughby June 1 and to Painesville July 1.

The Louisville Street Railway Company has declared a dividend of one and one-half per cent on its common stock in addition to the regular dividend of two and one-half per cent on its preferred stock. This is the first dividend on its common stock since the company was organized, seven years ago, and it is the intention to continue such payments semi-annually, if possible.

The executive staff of the Nassau Electric Railroad Company, Brooklyn, are Albert L. Johnson, general manager; J. J. Coleman and Thomas Casey, superintendents. The officers are Patrick Flynn, president; Fred C. Cochou, secretary; and the directors, George Damen, George S. Studwell, James F. Casey, Joseph B. McQuinlan, William J. Studwell, and Silas B. Dutcher.

President John N. Partridge, of the Brooklyn City & Newtown Railroad Company, Brooklyn, N. Y., recently contracted with the Falk Manufacturing Company, of Milwaukee, for the cast-welding of his road on DeKalb avenue between Broadway and Fulton street. This modern method of welding is meeting with much favor among practical street railway men, and the Falk people are greatly pleased with this order from Colonel Partridge, whose road is looked upon as a model in construction and management.

Says the Norwalk, Ohio, *Press:* "Electric railways have displaced in the United States no less than 275,000 horses. So many horses would require about 125,000 bushels of grain a day to feed them, amounting to 45,000,000 bushels a year. The loss of the commercial demand for this grain in the cities where these railways run means an enormous loss of transportation tonnage for the railways—some 62,500 carloads. Here is a question of domestic economy that is serious. But, although electric railways come thus high, in other respects they must still be tolerated and encouraged."

The Citizens' Street Railway Company, of Kalamazoo, Mich., is now owned by local capitalists, and will be managed by E. E. Downs, who built the road. The board of directors of the new local company are F. N. Rowley, Major Loren N. Downs, E. E. Downs, L. M. Gates, and Joseph Wyckoff. The officers are: President, Fred N. Rowley; vice-president and secretary, Major L. N. Downs; treasurer, L. M. Gates; general manager, E. E. Downs. The line will be improved. Messrs. L. N. and E. E. Downs, E. S. Roos, and H. R. Kauffer are the owners of the remodeled and newly constructed Battle Creek Railway, which has given the best of satisfaction under the present management, that has given the people of that city rapid transit service to Goguac Lake and other places of amusement. The Lansing system is also owned by Messrs. L. N. and E. E. Downs and F. N. Rowley, who are the officers.

Roentgen's American Cousin.

The nearest blood relative of Prof. Wilhelm Conrad Roentgen, discoverer of the X rays, lives at Cleveland, Ohio, says the New York *Sun*. He is the Rev. Dr. J. H. C. Roentgen, pastor of the First Reformed Church in Cleveland, and superintendent of the German Hospital there, and is a cousin of the famous professor, his father and Professor Roentgen's father being brothers. Professor Roentgen was the only child of his parents, and has no children himself.

To a Brooklyn acquaintance, who visited him in Cleveland, recently, Dr. Roentgen gave the following personal account of his cousin: Professor Roentgen was born March 28, 1845, at Lennep, near Elberfeld, Rhenish Prussia. His father was a native of Lennep, but his mother was a Dutch woman. When he was yet a young boy his parents removed to Appeldoorn, Holland, and there his early life was spent. His parents were quite well to do, and he was their only child. He attended school in Appledoorn until old enough and far enough advanced in his studies to enter college, and then went to the famous old University of Utrecht. After being graduated at Utrecht he entered the Polytechnic at Zurich, Switzerland, and on June 12, 1869, when 24 years old, received a degree of doctor from that institution.

Early in the following year, 1870, he secured an appointment as assistant in the Physical Laboratory in Strassburg, under the distinguished physicist, Professor Kundt. In March, 1874, he was made private instructor in the laboratory, and two years later became a professor of physical science in the University at Strassburg. In 1879 he was appointed director of the Physical Laboratory at Giesen, and went thence to the University of Stuttgart, and last to the University of Wurzburg. It was at the latter place that Professor Roentgen made the discovery of the X rays.

Professor Roentgen is a tall, well-built, and notably strong and robust person. His hair and beard are unusually long and abundant, and are dark-brown in color. His features are sharp, strong, and regular, and his eyes are notably keen and bright. He is, and always has been from his youth, a very close student, spending most of his time in his laboratory.

Professor Roentgen's wife is a Swiss, and, as already said, they have no children. Dr. Roentgen, of Cleveland, has one sister, and these two cousins are Professor Roentgen's nearest living relatives.

Tesla on Roentgen's Rays.

[*From the Review of Reviews, April, 1896.*]

The leading article of the month on the Roentgen rays is Nikola Tesla's contribution on the subject, appearing in the ELECTRICAL REVIEW. At once, on hearing of Roentgen's discovery, Mr. Tesla repeated the learned professor's experiment, and since then has been devoting his energies to the investigation of the nature of the radiations and to the perfecting of the means for their production. He describes in detail the methods he has employed and the arrangement of his apparatus. Suffice it here to say that he has been able to obtain shadows with comparatively short exposures at distances of many feet, while at small distances and with thin subjects exposures of a few seconds are practicable. The first shadow taken with his improved apparatus was that of a copper wire bent so as to form the word "Roentgen," projected at a distance of 11 feet through a wooden cover over the sensitive plate. A similar impression was obtained through the body of the experimenter, a plate of glass nearly three-sixteenths of an inch thick, a thickness of wood of fully two inches, and through a distance of about four feet. By improvements in his apparatus Mr. Tesla is confident that he can magnify the effects many times.

Knows Where To Find the News.

[*From The Independent, New York, April 9, 1896.*]

We go to the ELECTRICAL REVIEW for the latest information on the X rays.

LITERARY.

The *Review of Reviews* is almost indispensable to the general reader who wishes to keep abreast of the rapidly developing international questions of the day. In the April number there is a full and able editorial discussion on the complicated African situation, which is described as "the drama of 'Europe in Africa.'" The mixed interests and motives of England, Russia, Italy, and France in the Dark Continent are clearly set forth.

Some time ago the editor of *The Missouri Editor*, published at Columbia, Mo., wrote to Mr. Charles A. Dana, editor of the *New York Sun*, asking for a short list of books valuable for country editors. Mr. Dana's reply was published in *The Missouri Editor* for March, 1896:

NEW YORK, February 26, 1896.

DEAR SIR: I inclose a little list of books which seem to be indispensable, not merely to country editors, but to every person of American origin.

Yours sincerely, C. A. DANA.

WALTER WILLIAMS, Esq.

The Bible, the Declaration of Independence, the Constitution of the United States, Bancroft's History of the United States, McClure's Life of Lincoln (partially published), Irving's Life of Washington, Franklin's Autobiography, Channing's Essay on Napoleon Bonaparte, Gibbon's Decline and Fall of the Roman Empire, Shakespeare.

Westinghouse Copper Mines.

It is reported that Westinghouse interests have secured control of the Washington Camp group of copper mines in Pima County, Arizona, the heaviest producing copper properties in that territory. It is said that a new smelter will be erected at this central point and an extensive industry inaugurated to supply the Westinghouse company with copper for manufacturing purposes. The copper is said to be of the very best. The purchase price for the mines is stated as being $70,000.

ELECTRICAL GOSSIP.

THE LATEST NEWS ABOUT "COMBINES" AND OTHER THINGS.

The May number of *Scribner's* will contain five complete short stories by Octave Thanet, Brander Matthews, Gertrude Hall, J. West Roosevelt, and W. J. Henderson.

It is stated that General Manager Ellmaker, of the Consolidated Traction Company, of New Jersey, since he assumed that office, has reduced operating expenses from 70 per cent to 55 per cent, and he hopes to be able to further reduce them to 50 per cent.

The Utica Electric Manufacturing Company, Utica, N. Y., are pushing an excellent line of arc knife and disk arc switches, ironclad fuse boxes, lightning arresters and mast arms. The street railway switch, known as the "Leary Turn-out," which they make, is well known in the street railway field.

The Electric Railway Switch and Supply Company, of Springfield, Mass., are placing on the market a new, double-pole, single-throw switch, known as the Davis "Infant" switch. Mr. Davis, the president of the company, expresses the belief that it is an improvement on anything in this line now in the field.

The franchises of the Cincinnati street railways run 20 years. That of the Cincinnati Street Railway, capital $11,000,000, has 19 years to run, having been renewed or extended last year. A bill is now in the legislature, and passed one branch, to extend the franchise to 50 years and permit the consolidation of all the street railway lines.

The Tropical Electric Company, of Key West, Fla., capital stock $50,000, will be incorporated by J. L. Watrous, J. M. Phipps, and E. M. Martin, all of Key West. The company will build telegraph lines and an electric railroad in and from the city of Key West, through the counties of Monroe and Dade, by the most practicable route, to a point on Biscayne Bay, near the mouth of the Miami River, a distance of about 150 miles.

Among the interesting bits of gossip going around in electrical circles is that the American Carbon Company, of Noblesville, Ind., have recently taken away from the carbon "combine," with headquarters in Cleveland, several big customers, one of the chief of these being the Municipal Electric Light Company, of Brooklyn. Mr. Benjamin F. Miles, the head and front of the carbon alliance, was in New York city recently, endeavoring to stay the hand of fate, but without success. Several of the other "outside" companies are said to have reaped the reward of big orders, due to merit in their product and the decided inclination of the electrical consumers to deal with independent concerns. The companies that are said to be specially rejoicing are the Washington Carbon Company, of Pittsburgh; the Partridge company, of Sandusky; the Phœnix company, of St. Louis, and the Solar company, of Pittsburgh.

PERSONAL.

Mr. S. M. Hamill, of the Brush Electric Company, Cleveland, Ohio, visited New York city last week.

Mr. Charles E. Newton, of the Jewell Belting Company, Hartford, Ct., visited New York city last week.

Mr. C. O. Baker, Jr., the well known platinum man, is back again in New York after a month's tour of the western cities.

Mr. James I. Ayer, general manager of the American Electric Heating Corporation, of Boston, visited New York city last week.

Mr. Stanley S. Stout, counsel for the Western Telephone Construction Company, Chicago, made a brief visit to New York city last week.

Mr. Harrison J. Smith, general superintendent of the Edison Electric Illuminating Company of New York, has returned from a brief but well-earned vacation in Florida.

Mr. B. E. Greene, of New York city, recently made a trip to Washington, D. C. He reports that Senator Fred W. Royce and the Washington monument are looking well, and that the senator is largely interested in suburban electric lines.

Mr. J. H. Vail, the well known engineer, has accepted the appointment of engineer-in-chief of the Pennsylvania Heat, Light and Power Company, of Philadelphia. In his new position Mr. Vail will have full charge of the Edison Electric Light Company of Philadelphia and all its sub-stations in that city. Mr. Vail is eminently fitted, both by training and experience, to occupy the place to which he has been appointed. The ELECTRICAL REVIEW congratulates the Pennsylvania Heat, Light and Power Company on securing his services.

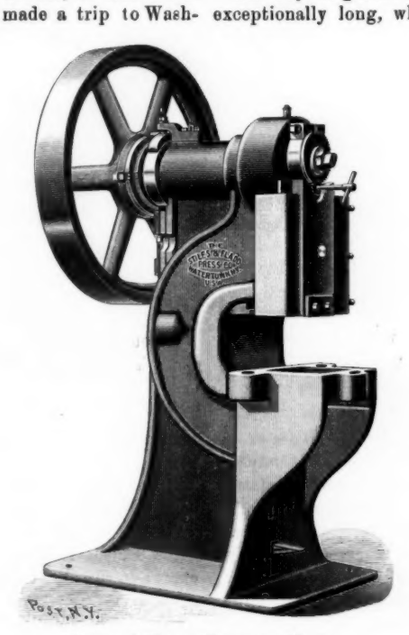
It is announced that Johnston's *Street Railway Gazette* will hereafter appear twice a month instead of weekly, as heretofore. This may be but the first step toward making our degenerating tea-green contemporary an annual and the *Gazette* a quarterly.

Stiles & Fladd Punching Press.

The construction and designing of punching presses have reached that stage in the science where every strain has been carefully considered and the iron so placed as to best resist the strains that are brought to bear, and also at the same time provide for a limit of safety. In the accompanying illustration is shown a new punching press, which, while it follows in a general way the well known Stiles press, still embodies such improvements as the trade demands and the knowledge of such demands warrants.

Only a special mixture of iron is used in the castings, and such a mixture showing the greatest strength, which is continually tested and retained to an established standard. Every part on which the slightest wear occurs is carefully scraped to an exact fit, and thereby provides a perfect bearing surface.

The ways or guides of the slide are exceptionally long, which resist absolutely any side thrust. The clutch adopted by this company to be used on this press is one that has been perfected and recently patented by the inventor of the original Stiles clutch and Stiles press, and is superior in many ways to that well known clutch. Among the special features are the ability to run the press in either direction equally well, three points of contact in the wheel causing the clutch to be practically instantaneous; the power vested in the operator to make at will a whole revolution or only a part, as he may desire, which is a valuable feature, thereby preventing accidents both to tools and operators. The clutch can be used to back out a punch that may become stuck in the die, and is claimed by the manufacturers to be the latest and best press clutch built.



STILES & FLADD PUNCHING PRESS.

These presses are manufactured by the Stiles & Fladd Press Company, of Watertown, N. Y., in six sizes, weighing from 500 to 7,500 pounds, as fly presses, and in five sizes, ranging in weight from 1,200 to 8,000 pounds, as geared presses. The patterns are so constructed that an endless variety of modifications and changes can be made to adapt them to special work and tools of any make.

KIND WORDS.

WANTS MORE OF A GOOD THING.

To the Editor of Electrical Review:

I inclose post office order for another year's subscription to your paper. Please credit me with the same and let the good paper continue to come. Yours truly,

TELEPHONIST.

Kansas, April 4.

A VALUABLE PAPER AND A VALUABLE BOOK.

To the Editor of Electrical Review:

Please find inclosed post office order for $4, being $3 for your valuable paper and $1 for "The Telephone Hand Book," by Webb, which I should be glad to have you send me at your earliest convenience.

Yours sincerely,

W. C. V.

Utica, N. Y., March 21.

WANTS THE BEST, GETS IT, AND READS THE ADS.

To the Editor of Electrical Review:

Inclosed you will find post office order for $3 for the ELECTRICAL REVIEW. I believe it is the best electrical paper published.

Can you tell me who manufactures the —— fan and where they are? I do not see the name among your advertisers. It ought to be and every one else who has anything electric to sell. Yours truly,

SUPERINTENDENT.

Texas, April 2.

OLDEST, MOST VIGOROUS, BEST.

To the Editor of Electrical Review:

Your last issue, containing very valuable and interesting special communications, can not fail to impress any reader of the ELECTRICAL REVIEW that, though the oldest American weekly, it is also the most vigorous and best informed electrical journal. I have heard a great many well informed people talk about the interesting articles published in the ELECTRICAL REVIEW of New York.

M. C. V.

Boston, April 9.

OBITUARY.

Myron H. Beals, superintendent of the Petoskey, Mich., Edison Electric Light Company, died of typhoid-pneumonia on March 28.

Mr. W. T. M. Mottram, formerly with the General Electric Company and latterly engaged in the electrical contracting business in Texas, died recently in New Orleans.

William B. Tobey, general manager of the Ecuador General Electric Company, died recently at Guayaquil, presumably of fever. He had been connected with Mr. William Stanley, Jr., of Pittsfield, Mass., and lately had been manager of the S. K. C. Specialty Company, of Pittsfield. Mr. Tobey was 27 years old, a graduate of Cornell, and had a bright future before him. The news of his death came as a great shock to his many friends.

OUR CANADIAN LETTER.

BOTHWELL, ONT.—The question of installing an electric light plant is under consideration.

ST. JOHN'S, NFLD.—It is said that St. John's, Newfoundland, is to have an electric street railway.

TORONTO, ONT.—The Royal Electric Company is extending its premises on York street, Toronto, Ont.

WINNIPEG, MAN.—The city solicitor has been instructed to prepare two by-laws for submission to the rate-payers, for an electric light plant.

DURHAM, ONT.—The *Grey Review* says that J. H. Kilmer has secured enough subscribers in Durham to justify him in putting in an electric lighting plant.

PAKENHAM, ONT.—A Pakenham, Ont., gentleman, who has gone into the electric light business, is contemplating the extension of his system to Arnprior.

WESTPORT, ONT.—W. A. Fredenburg will put in an electric light plant in Westport, Leeds County, Ont., provided the town will guarantee him 200 lights at two and a half cents per light.

ALBERNI, B. C.—The bill incorporating the Alberni Water, Electric and Telephone Company has received its second reading in the legislature. One of the objects of the company is to provide a water supply.

KINGSTON, ONT.—The City Council of Kingston, Ont., are in favor of municipal ownership of lighting plants, as the replies to the inquiries sent out by them to cities all over the continent point in that direction.

TORONTO, ONT.—J. Barrett, of Toronto, Ont., is asking permission to erect poles and wires for the purpose of transmitting power and light throughout the township of York. The electricity will be generated at the Humber.

TAVISTOCK, ONT.—The Canadian Electric Light Company has a gang of men at work putting up the poles in connection with the electric lights for Tavistock, Ont. The dynamo is to have its seat at the Tavistock Woolen Mills of J. G. Field.

NEWMARKET, ONT.—The council propose submitting a by-law to raise $9,000 to put in a system of arc lights for the streets and incandescent lights for commercial and domestic purposes. The dynamos will be operated by steam power.

LONDON, ONT.—E. Leonard & Sons, of London, Ont., recently bought the electric light plant of the Grand Central Hotel, St. Thomas, Ont., for $520. The plant consists of engine, boiler, dynamo, poles, and wires, and originally cost about $2,500.

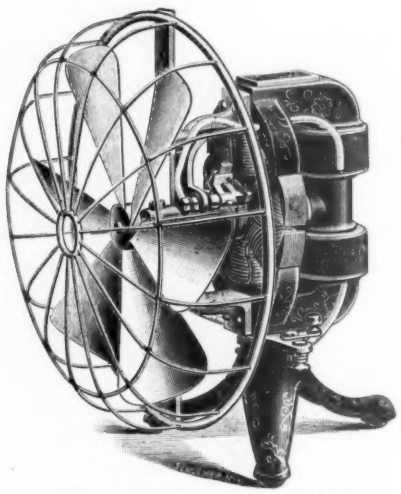


FIG. 1—EDISON BATTERY FAN MOTOR.

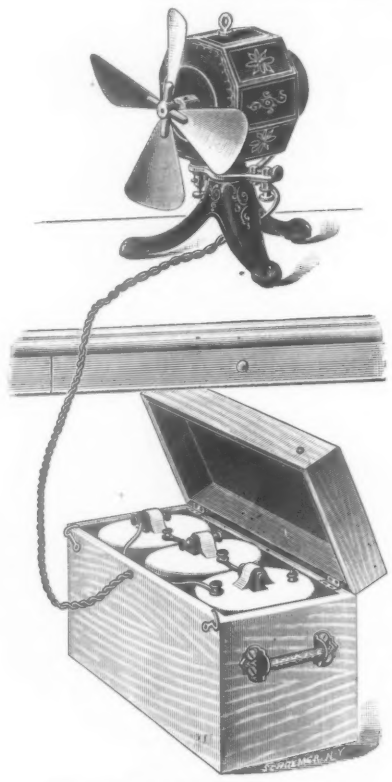


FIG. 2—EDISON IRONCLAD FAN MOTOR.

BELLEVILLE, ONT.—By-laws to allow the Trenton Electric Company to erect poles and string wires between Belleville and Trenton, and one to allow the Belleville Traction Company permission to extend its street railway from the city to the cemetery, were recently adopted by the Belleville, Ont., council.

MONTREAL, QUE.—At the annual meeting of the Citizens' Light and Power Company, Limited, Montreal, the following officers were elected directors: R. Wilson Smith, president; ex-Alderman Lyall, W. McLea Walbank, vice-presidents; J. H. Burland, M. P. Davis (Ottawa), J. H. Hénault (mayor of St. Cuvégonde), F. Dagenais, of St. Henri. This company is acting in concert with the Lachine Power and Light Company. It has also bought out the Standard Light and Power Company, whose rights extend all over the Province of Quebec. The company proposes to put its wires underground at an early date.

Montreal, April 11. J. A. C.

A New Fixture Company.

The Staines, Peck & Taber Company, capital, $5,000, has been formed in Brooklyn, N. Y., to manufacture and deal in electric and gas fixtures. The directors of the company are Chas. T. Staines, of Newark, N. J.; Lewis A. Peck, of Brooklyn, and Thomas T. Taber, of Glen Cove, L. I.

Edison Battery Fan Motors.

The Edison Manufacturing Company, 110 East Twenty-third street, New York city, are ready for the hot weather with a line of electric fans operated by batteries. Fig. 1 shows the Edison battery fan motor. The complete outfit includes the motor with a nine-inch fan and guard, four Edison-Lalande batteries in porcelain jars, with a charge to run 125 hours, battery cords, etc., all contained in a handsome, polished oak box, 25 by 8 by 15 inches. In Fig. 2 is shown the Edison ironclad fan motor outfit complete. This consists of the motor with a seven-inch fan, battery cords, three Edison-Lalande batteries with charge to run the motor 75 hours, in an oak box, 18¾ by 7 by 9¾ inches. The motor is noiseless, has self-oiling bearings, and is entirely inclosed in an ironclad case, being provided with a glass window at the rear for regulation of brushes. The workmanship is of the very highest grade.

These battery outfits are designed to meet the needs of a large number of people who appreciate the cooling influences of an electric fan, but who have no available electric current. The prices are reasonable for first-class apparatus.

Meeting of Underground Men.

A meeting is to be held in New York during the present week by the manufacturers of underground conduits, with the view of reaching an understanding or agreement which shall put the prices of these materials on a better basis. Some of the companies which will be represented are: The Wyckoff Pipe Company, Williamsport, Pa.; Williamsport Pipe Company, Williamsport, Pa.; Michigan Pipe Company, Bay City, Mich.; National Conduit Company, New York; Connecticut Pipe Manufacturing Company, and a number of others.

A Missouri County Telephone System.

In January the contract for a telephone line connecting Mt. Vernon, Mo., Lawrence County seat, with the surrounding towns was let to the Southern Telephone Construction Company, Geo. R. Armstrong, of Pierce City, manager. The line connects Mt. Vernon, Stolts City, Friestatt, Pierce City, Aurora, and Marionville. At Aurora it will connect with a line that joins Springfield, Rogersville, Henderson, Marshfield, Seymour, Ozark, and Republic—the connection being made between Aurora and Ozark. From Pierce City it connects with a line from Cassville. The Cassville line connects Monett, Purdy, Butterfield, and other small places down to Sulphur Springs, Ark. In this way about 20 towns will be connected. The numbers of subscribers are: Mt. Vernon, 65; Monett, 120; Cassville, 165; Pierce City, 102; Stolts City, 10, and from 1 to 10 in the intermediate villages. The telephones used are the Hunnings dust transmitter. The line will be completed, ready for use, in about a week.

Radiographs Without Photographic Plates.

[*From the Electrical Review, London.*]

Righi describes, in *L'Electricien*, an apparatus by which he obtains the Roentgen pictures without the use of the photographic plate, by a method similar to that employed by Lichtenberg and Kundt. Under the Crookes tube is fixed a sheet of black cardboard, backed by a sheet of aluminum, which is connected to earth. Below this is fixed a sheet of ebonite, backed with tinfoil, which latter is connected through an air condenser to the cathode of the tube. The anode of the tube is also put to earth. If a hand is now laid on the cardboard, and subjected for a sufficient time to the action of the tube, it will be found that an electrical picture of the hand *a la* Roentgen has been imprinted on the sheet of ebonite. This can be made visible by the well known mixture of sulphur and red lead, or by another mixture of talc and dioxide and magnesium, which gives an effect more closely resembling a photograph. The bones, etc., are shown in these electrographs just the same as in the Roentgen photographs.

The Telephone in Sweden.

[*From London Engineering.*]

Stockholm has now a telephone for every 26 inhabitants, but it is not only the private telephone companies which have attained to extraordinary results in Sweden; also the State telephones have increased their subscribers rapidly during the last few years, as will appear from the following table: 1891, 10,294; 1892, 12,559; 1893, 15,971, 1894, 19,083; 1895, 22,100. During the same period the aggregate mileage has risen from 14,200 miles to 28,500 miles. The gross profits have risen from 41,000*l.* to 107,000*l.*, and the expense from 27,000*l.* to 53,000*l.* For the building and purchase of telephones, the State telegraphs have received 330,000*l.* from the exchequer, of which sum they have repaid 56,000*l.*

ADVANCE INFORMATION

Valuable News and Tips for Manufacturers and Dealers.

We publish below information relating to new electric railways, new electric light companies, new telephone companies and projected electric construction of all kinds. Every reader will find these columns of special interest, and manufacturers and supply houses will receive many valuable suggestions looking to new business by carefully watching this department in the ELECTRICAL REVIEW.

New Electric Railways.

HAGERSTOWN, MD.—The contract for the building and construction of the Hagerstown Street Railway has been let to John A. Herman, Christian W. Lynch and William Jennings, of Harrisburg, Pa., and will cost from $175,000 to $200,000.

ELYRIA, OHIO — Lorain County Electric Railway Company has been incorporated. Capital stock, $300,000.

CHICAGO, ILL.—The Chicago General Railway Company has closed a contract with John E. Wilkie & Company for the construction of 14 miles of new track.

MARTINSBURG, W. VA.—The electric cars and trailers belonging to the Martinsburg Street Railway Company have been sold by E. P. H. Harrison as general receiver.

WAYCROSS, GA. — F. B. Sirmans and S. R. Patterson, of Clinch County, are making arrangements for building a railroad from Dupont to Fitzgerald.

NORTH EASTON, MASS. — It was rumored about here that the New York, New Haven & Hartford Railroad had bought up the franchise of the Brockton Street Railway Company, and that consequently no electric road would be built between this city and North Easton.

LEWISTON, N. Y.—The Lewiston & Youngstown Electric Railroad will be built this year.

ST. LOUIS, MO. — The Jefferson Barracks extension of the Southern Electric Railway Line is to be a double-track road, instead of a single-track line, as was intended. The company has decided to issue bonds to the amount of $200,000 to cover the cost of construction and equipment of the six miles of tracks, with 13 elegant new cars. The road is to be completed and in operation by May 15.

MARLBORO, MASS. — The new Worcester & Marlboro Street Railway Company will run from Worcester, through Shrewsbury and Northboro, to this city, with a branch from Northboro to Westboro. It will be 20 miles in length. It is capitalized at $200,000.

PETERSBURG, VA.—The Petersburg Street Electric Railway Company are to make some improvements to their depot on the corner of River and Second streets.

YONKERS, N. Y.—A certificate of consolidation of the Yonkers Railway Company, the North & South Electric Company and the Yonkers & Tarrytown Electric Railroad Company has been filed. The name of the new corporation is the Yonkers Railroad Company. The capital stock is $1,000,000. The directors are Albert L. Johnson, J. M. Edwards, R. T. Wilson, Jr., John H. Ingram and M. O. Wilson, of New York city; J. F. Van Name and Albert Crolius, of Brooklyn, and Channing Burnz, of Scarsdale. The company's principal office will be in Yonkers.

ELGIN, ILL. — The Elgin City Electric Railway Company has let the contract for an electric line from this place to Geneva, a distance of 13 miles, to the Yawger Construction Company, of Bucyrus, Ohio.

WARE, MASS. — The citizens interested in the construction of the electric road for Ware held a meeting recently and organized a company as follows: I. L. Currier, of Worcester, president and treasurer; Henry M. Clark, secretary; I. L. Currier, F. F. Gilmore, George E. Utley, E. Terrien, Henry C. Davis, John H. Storrs and Henry M. Clark, directors. The road will cost $150,000.

CHERRY HILL, MD.—The Cherry Hill, Elkton & Chesapeake City Electric Railway Company has been incorporated to build an electric railway between Cherry Hill and Chesapeake City.

JAMAICA, N. Y.—The Long Island Electric Railway Company will extend its road.

WINCHESTER, MASS.—The Mystic Valley Street Railway Company has been incorporated by Albin Coffin and A. E. Whitney, of Winchester; Onslow Gilmore and C. H. Brown, of Stonehamp; Chas. F. Woodward, of Wakefield, and J. E. Shaw, of Newburyport, to construct an electric railway from Winchester to Stoneham, Mass. Capital stock, $40.000.

ALAMEDA, CAL.—The California or Laundry Farm Railroad is to be transformed from a steam to an electric line.

RISING SUN, MD.—The Rising Sun, Northeast & Elk River Electric Railway Company has been incorporated by Andrew Anderson, J. M. Carhart, M. E. Kirkand J. T. Reed, of Cecilton, Md.

ST. LOUIS, MO.— The Southern Electric Railway Company will build an extension to its road. It will issue $200,000 in five per cent bonds to pay for same.

JERSEY CITY, N. J. — Electric Steam Appliance Company has been incorporated by Alfred Leittman, New York city; Edwin G. Maturin, of Jersey City, N. J., and Herbert F. Hatch, of East Orange, N. J. Capital stock, $500,000.

MILLBURY, MASS.—The Blackstone Valley electric railway work will be commenced for the continuation of the building of the road, so as to complete and equip same and put it in operation.

Electric Light and Power.

JANESVILLE, WIS.—The contract for a lighting plant at the Janesville School for the Blind has been awarded to the Western Electric Company, of Chicago, at $1,240.

LITTLE VALLEY, N. Y.—Citizens of this place have voted to raise $1,000 to complete the electric light plant here.

WAUPACA, WIS.—A franchise for a waterworks plant at the estimated cost of $50,000 has been granted to A. M. Hanson and F. S. Baldwin. The franchise runs for 35 years. The city reserves the right to purchase within one year.

FORT FAIRFIELD, ME. — The Stevens Electric Company has bought out the Holmes system of lights, so called, from Stevensville down to and including Fort Fairfield village and the boundary line buildings.

CAPE CHARLES, VA.—The Export Lock Oyster Company will establish an electric light plant to light the town by electricity.

LAKE CITY, FLA. — Lake City Water and Light Company, W. R. Bush, superintendent, has completed the addition to its building and the city will soon be supplied by electric lights.

MADISON, WIS.—Eastern capitalists are negotiating for the purchase of the Madison Gas Company and the Four Lakes Electric Light and Power Company, both of which are controlled by the same local capitalists. The deal involves a consideration of about $200,000.

APPLETON, WIS. — M. K. Gochnauer, City Clerk, is inviting bids for lighting the city for two years, with privilege of three additional years.

HIGH SPRINGS, FLA.—S. A. Levy, Mayor, can give information concerning construction of electric light plant.

LANCASTER, S. C.—The Lancaster cotton mills are in the market for an electric light plant for mills.

EGG HARBOR CITY, N. J.—Wm. Mischlich, Mayor, can give information concerning construction of electric light plant.

SWEETWATER, TENN. — J. W. Clark is interested in the construction of an electric light plant.

HART, MICH.—An electric light plant is to be constructed and bids are being invited for the erection of same.

PEORIA, ILL.—J. R. Conway, City Clerk, is inviting bids until April 21, for lighting the streets with electricity for a term of two years.

CRAWFORDSVILLE, IND. — James M. Waugh, city engineer, can give information concerning extension of electric light plant at a cost of $15,000.

OREGON, MO.—The Oregon & Forest City Railway, Light and Power Company will erect an electric power plant to operate its road. Will want electrical machinery, etc.

JACKSON, MISS.—The Institution for the Education of the Deaf and Blind will put in an electric lighting plant. In the market for electrical equipment.

CICERO, IND.—Cicero Heat and Light Company has been incorporated to furnish natural gas and electric light. Capital stock, $50,000.

JOHNSTOWN, PA.—The Johnstown Electric Light Company will build an addition to its plant and add new machinery.

DAVENPORT, IOWA—The Davenport Gas, Electric Light and Steam Heating Company has purchased the Davenport Gas Company's plant.

CLEVELAND, OHIO—Milan Gallagher is interested in the construction of three electric light plants, for which bill is pending in legislature for the issuing of $1,500,000 in bonds for the erection of same.

ITHACA, MICH.—Ithaca Light and Power Company has been incorporated by C. E. Webster, Wolf Netzorg, J. B. Crawford, and others. Capital stock, $15,000.

New Telephone and Telegraph Companies.

MERCER, PA.—Mercer Telephone and Telegraph Company has been incorporated with John J. Gordon, of Mercer, treasurer. Capital stock, $20,000.

MADISON, WIS.—The La Crosse & Southeastern Telephone Company has been incorporated by William Lohmiller, E. B. Magill, and John E. McConnell. Capital stock, $15,000.

NIAGARA FALLS, N. Y.—A new telephone service is to be established here.

NEW YORK, N. Y.—The New York Union Telegraph Company has been incorporated to operate among the cities and villages and towns of Franklin and St. Lawrence counties. Capital, $3,000. Directors, Newton W. Lawrence, C. E. Pearl, Frederick L. Dickinson, and A. F. Russell, of Bangor, Franklin County, and Robert McLaughlin, George A. Martin, and Romanzo Joy, of Brandon, Franklin County.

WINONA, WIS.—The new telephone company in this place will extend its service to Rochester, Minnesota, and other points, possibly to Galesville, in this State.

New Manufacturing Companies.

CHICAGO, ILL. — Rieth Electric Company has been incorporated; capital stock, $4,500. Incorporators, Robert D. Rowe, Peter Rieth and John M. McNabb.

NEW YORK, N. Y.—The Fleming-Spence Electric Company has been incorporated; capital stock, $100,000. Directors, Richard Fleming, William H. Spence and Thomas J. Fleming.

JERSEY CITY, N. J. — American Car Improvement Company has been incorporated by Frederic W. Hunter, of Jersey City, and Louis M. Porter and W. B. Bremmer, of New York city, to manufacture railway equipments, steam, electric and street cars, etc. Capital stock, $400,000.

Increase of Capital.

BOSTON, MASS.—The New London Street Railway Company will increase its capital stock April 20 from $165,000 to $247,000.

NEW YORK, N. Y. — The Kings County Traction Company, incorporated recently, has increased its capital $4,500,000.

Something About the Correspondence System of Education.

The development of the correspondence method of study is one of the achievements of recent years. A plan of education whereby a student can procure even a very ordinary education in the arts and sciences, without attending a college or leaving his employment, greatly extends the opportunities of acquiring knowledge, for a thirst for practical information is perhaps more common among the wage earning classes of America than of any other nation.

That courses in technical studies are given by correspondence is news to many, and when they know this to be a fact, the average person has little or a very incorrect idea of how it is done. A brief description may set some of the readers of the ELECTRICAL REVIEW right upon the matter.

Take, for instance, the system of the Institute for Home Study of Engineering, of Cleveland, Ohio, which originated the plan of teaching electricity by correspondence. When a student enrolls for any electrical course he is first sent an examination in arithmetic. If he passes it he is through with that study and can begin electricity. If he fails he is sent the arithmetic pamphlets of the Institute, specially prepared by its instructors, and takes up the subject where he begins to be cloudy. He works out the drill problems and sends them to the school, which transmits back corrections and complete explanations, if any are required. When he has acquired a working knowledge of all parts of arithmetic with which he was not familiar, he is ready for electricity. The reason for this is obvious, for arithmetical calculations are the major part of electricity. Algebra, geometry, and trigonometry may be taken simultaneously with electricity.

The papers on electricity which he studies are sent him by the Institute the same as the mathematical papers. He is also sent some electrical apparatus for experimental work. This is very important in beginning, in order to get correct and practical ideas of the first principles. The system is the same as mentioned in the study of arithmetic. The text is clear and problems are ingeniously built upon it, so that digestion of it is necessary to a correct solution of these problems. Every minute point is illustrated and made the subject of drill, so that the student advances step by step and understands as he goes.

One of the features of this Institute's system is the making and keeping of a copy of his work by the student, by the use of a carbon sheet, so that he can turn to any line of any page of his work, upon receiving from the Institute corrections, notations, and comment, and know exactly their full significance.

It is obvious that merely a book knowledge of dynamos can never be very helpful in itself to one having to do with such machines. A practical without a theoretical knowledge is better than the reverse, but a combination is needed to make a sure success. This truth was recognized by the Institute. Its engineers developed a dynamo which is not only a commercial but an experimental machine of wide range, being for both direct and alternating currents —when used as the latter it is self-exciting—and a volt and ammeter (combined) for students' use in their work, after a certain amount of ground has been covered. These are used by the student at his own home. The dynamo is first wound and connected by the student, so that he is familiar with these operations.

One of the features of a correspondence school for technical instruction is that the student requires no books. This is one of the most difficult points for one who hears of it only casually to understand. The system can not be carried on to the best advantage by the use of ordinary text books. This requires the writing and printing of the text books by the school.

The system, as carried out by the Institute for Home Study of Engineering, is thorough and efficient. Its chief instructor in electricity is Nelson W. Perry, well known as an electrical engineer.

Marriage of Miss Gertrude Bunnell and Mr. A. J. Wise.

Miss Gertrude Van Duser Bunnell, daughter of Mr. and Mrs. Jesse H. Bunnell, of 271 Berkeley place, Brooklyn, N.Y., was married on April 8 to Albert J. Wise. The ceremony, which took place at the pleasant home of the bride's parents, was performed by the Rev. Dr. George Breed. Miss Edith Bunnell, a sister of the bride, attended as maid of honor. Charles McLaughlin, T. C. Long, Walter Phillips, and Lambeer Sedan officiated as ushers. The rooms were tastefully decorated with palms, lilies, and field daisies. Among the electrical people present were Mr. and Mrs. A. B. Chandler, Mr. and Mrs. G. G. Ward, and Mr. and Mrs. E. A. Leslie.

American Institute of Electrical Engineers.

TO THE EDITOR OF ELECTRICAL REVIEW:

The 105th meeting of the Institute will be held at 12 West Thirty-first street, New York city, on Wednesday, April 22, at 8 P. M.

A paper will be read by Mr. D. McFarlan Moore, of Newark, N. J., "On Recent Developments in Vacuum Tube Lighting," accompanied by experiments. The hall will also be lighted by these tubes.

Yours truly,

RALPH W. POPE,
Secretary.

New York, April 9.

A New Storage Battery Car in Cleveland.

A test will be made by the Cleveland, Ohio, City Railway Company, with a car equipped with storage batteries and a gasoline engine. When a representative of the ELECTRICAL REVIEW saw the car in the company's Superior street building in Cleveland the promoters were sanguine of a successful outcome of the experiment, and Electrician Washburn was superintending a few details of construction before the test. Near one platform of the car is a very compact Sintz gasoline engine of 10-horse power, operating a motor and generator and charging the storage batteries. The motor, of the shunt type, male by the Walker Manufacturing Company, is placed on Brill trucks in the usual manner, and 100 cells of the battery manufactured by the Ohio Storage Battery Company, of Cleveland, are under the seats on either side of the car. They are charged from the gasoline engine. The motorman does not at any time touch the engine as that is adjusted for the trip before he starts.

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KINDRED INTERESTS

The Ashcroft Manufacturing Company has purchased the Edson recording and alarm gauge from Mr. Jarvis B. Edson, and will hereafter be the sole manufacturer of the gauge.

The Kester Soldering Compound, manufactured by the Kester Electric Manufacturing Company, Buffalo, N.Y., is pronounced by many electricians as the most satisfactory flux for use in telephone, telegraph, electric light, and trolley construction work.

The Birdsall Electric Manufacturing Company, 231 Broadway, New York, has just published a catalogue of new electric novelties. This company's line includes electrically illuminated clocks, jardinieres, medical batteries, and electric smokers' sets.

C. F. Splitdorf, 17 Vandewater street, New York, the well known manufacturer of induction coils and other electrical specialties, is equipping new shops, which will occupy an entire floor in the same building, which, by the way, is an unusually large one.

Mr. A. L. Fenton, who has had experience in the electrical field in connection with the Novak Incandescent Lamp Company, the Perkins Electric Switch Manufacturing Company, and the Bernstein Incandescent Lamp Company, has opened an office at 126 Liberty street, New York, as general agent for the Electric Protection Company, Electrical Specialty Company, and Wm. G. Pringle & Company, all of Philadelphia.

As Summer approaches the fan motor business awakes from a Winter's slumber. The Electric Appliance Company, of Chicago, already has quite a large stock of Meston alternating current fan motors, and are ready to do business on this specialty. Anticipation of requirements is always a good policy in placing orders for seasonable goods of this kind, and the Electric Appliance Company suggests that orders be placed as early as possible for the season's demands.

Metropolitan Electric Company, Chicago, Ill., have taken the exclusive western agency for the Gordon primary battery, which is manufactured by the Gordon-Burnham Battery Company, of New York. They are carrying a large stock of these batteries. The battery is the latest primary battery on the market and is found to give excellent service for railway signal devices, fire-alarm telegraph circuits, and other exposed points that require constant battery with a minimum of attention.

Owing to increasing business, the Crown Woven Wire Brush Company, of Salem, Mass., have moved into the new Power's Block, near the Boston & Maine railroad station, where they have a model factory, and hope to make even better brushes than heretofore. The growth of this company's business has been phenomenal, and is one of the results of making honest goods. Their Crown "K" brush in particular is meeting with great success. They are not only selling their brushes in the United States, but are sending them to Mexico and Canada, and hope very soon to place them on the English market. Their new factory, which is especially adapted to their business, will enable them not only to turn out brushes in greater quantities, but to compete with any goods in the world in quality and price.

NOTICE.

A practical manager, well known among electric light people in every State in the Union, and who, during the past nine years, has been occupied in the development of electric properties owned by two eastern syndicates, will be free to make new engagements on May 1.

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ELECTRICAL PATENTS

ISSUED APRIL 7, 1896.

557,534 Pressure alarm for gaspipe; F. S. Baker, Chicago, Ill.

557,535 Electric car truck; C. F. Baker, Boston, Mass.

557,588 Telephony; W. C. Lockwood, Brooklyn, N. Y.—A variable resistance for a telephone transmitter, consisting of two flat, disconnected electrodes located between suitable flat, flexible plates, in a suitable shell, and a filling of loose conductive material packed in the shell around the electrodes.

557,600 Insulator; C. A. Peterson, Stratton, Neb.

557,648 Electric arc lamp; H. E. Bradley, Pawtucket, R. I.—An arc lamp having a star wheel forming part of a system of wheel gearing actuated by the weight of the upper carbon, in combination with a pendulum and a stop limiting the motion of said pendulum engaging the star wheel and holding it fast when the lamp is not feeding, and acting as a retarding device when the lamp is feeding.

557,650 Electric indicator for hot journal boxes; W. E. Chockley, Denver, Colo.

557,656 Machine for feeding and separating sheets of paper; E. Dummer, Newton, Mass.—A motive roller, a roller loosely maintained opposite the motive roller, and a magnet to move and hold, when energized, said roller away from the motive roller.

557,657 Electric railroad; W. B. Elliot, Chicago, Ill.—A magnet adapted to be used on an electric car for actuating a contact-making device, consisting of a straight central portion having downwardly curved ends on a lower plane than the central portion.

557,678 Commutator brush-holder; R. Hirsch, Milwaukee, Wis.

557,690 Wire connector; C. H. McIntire, Newark, N. J.—A connector for electric wires, consisting of a metal strip bent into the shape of an oval tube and having its edges soldered or welded together.

557,708 Testing apparatus for multiple switchboards. 557,898 Lockout system for telephone lines; C. E. Scribner, Chicago, Ill.

557,714 Electric motor; I. E. Storey, Hornellsville, N. Y.—Consists of an inclosing shell provided with an opening, a disk or plate of insulating material fitting into the opening and supporting a brush-holder, and a removable cap adapted to cover the opening.

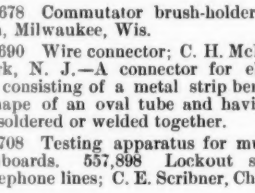
557,782 Adjustable incandescent lamp-holder; E. Wade, Lawrence, Mass.

557,749 Automatic electric railway signal; W. W. Alexander, Kansas City, Mo.—A power train of wheels operating simultaneously a semaphore and a message transmitting device, a set of trigger levers, an electro-magnet controlling said levers, and an escapement device for retarding the power train.

557,777 Electric switch; A. K. Dresher, Worcester, Pa.—A switch provided with mechanism for causing a long break and short make, formed of a long and short spring and wedge cams.

557,779 Galvanic battery jar; C. C. Dusenbury, New York, N. Y.

557,784 Closed conduit and appliance for electric railroads; W. R. Edelen, Washington, D. C.—Has a series of covers, each



No. 557,819.—WINDING DEVICE FOR ELECTRIC CABLES IN ELEVATORS.

normally locked in a closed position, and adapted to be released or unlocked by the movement of a preceding cover.

557,809 Electrically operated agricultural machine; I. Hogeland, Chicago, Ill.

557,819 Winding device for electric cables in elevators; D. E. Houser, Fort Wayne, Ind.

557,830 Conduit for electrical conductors; J. M. Kinney, Boston, Mass.—A conduit for electrical conductors formed of a series of layers of paper, first saturated with alum and coated with a mixture of bichromate of potash, glue, and diatomite.

557,848 Electric switch; P. E. Marchand, Ottawa, Can.—Consists of one or more stationary contacts, an oscillating contact, a stem or handle having a rotary and endwise movement, and detachably connected to the oscillating contact, and a spring for moving the oscillating member in a direction reverse to that imparted by the handle when the stem or handle is disconnected from said oscillating member.

557,854 Automatic battery reverser; P. Minnis, Mobile, Ala.

557,860 Hanger for wires; W. A. McCallum, Avondale, Ohio—Consists of a cap having interior projections, and the sleeve carrying an insulated suspensory bolt, and having projections for enabling the entering devices when the sleeve is rotated to interlock with the cap, and the locking-pin.

557,869 Armature core; G. D. Packard, Fort Wayne, Ind.—A laminated core built up of segmental laminæ having apertured ears for the fastening bolts, and united to the body of the blank by a contracted neck, adapted to shield the said bolts from the magnetic flux of the core.

557,881 Insulator; H. W. Rappleye, Philadelphia, Pa.

557,888 Shade for electric lights; W. E. Robinson, Faribault, Minn.—Comprises a shade leaf, a holder attached to the said leaf, provided with a head containing a spring, and a clamp having a loop passed through the head and in constant contact with the spring thereof.

557,920 Storage battery; A. F. Vetter, New York, N. Y.—A battery plate formed of a section of lead pipe or tube, closed at one end and cut away at the other end to form a conductor, provided with a filling of active material, closed together at the top and flattened and furnished with perforations.

557,957 Rotary field motor; C. S. Bradley, Avon, N. Y.—An alternating current motor having its secondary circuit, including a regulating switch for adjusting the inductance for electrical consonance at different motor speeds.

558,016 Electric rail bond; B. Ford, Johnstown, Pa.—A rail having integrally attached thereto a flexible extension, said extension having at its free end a head for attachment to an adjacent rail.

REISSUE.

11,529 Multiple switchboard for telephone exchanges; M. G. Kellog, Chicago, Ill.

PROPOSALS

FOR

Compressed Air and Electrical Equipment.

OFFICE OF THE DEPARTMENT OF PUBLIC WORKS, CHICAGO, April 9, 1896.

Sealed proposals will be received by the city of Chicago until 11 a. m. Tuesday, April 21, 1896, for the construction and installation of the compressed air and electrical equipment for the new rolling bascule bridge over the north branch of the Chicago River, at North Halsted street, in the city of Chicago, Illinois, according to plans and specifications on file in the office of the Department of Public Works of said city.

Proposals must be made out upon blanks furnished at said office, and be addressed to said department, indorsed "Proposals for Compressed Air and Electrical Equipment, North Halsted Street Bridge," and be accompanied with $1,000 in money or a certified check for the same amount on some responsible bank doing business in the city of Chicago, and made payable to the order of the Commissioner of Public Works.

The Commissioner of Public Works reserves the right to reject any or all bids.

No proposal will be considered unless the party offering it shall furnish evidence satisfactory to the Commissioner of Public Works of his ability, and that he has the necessary facilities, together with sufficient pecuniary resources, to fulfill the conditions of the contract and specifications, provided such contract should be awarded to him.

Companies or firms bidding will give the individual names, as well as the name of the firm, with their address.

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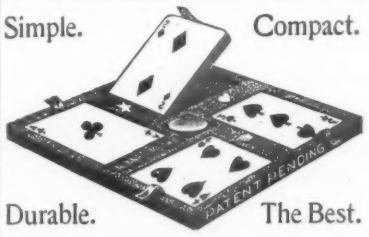

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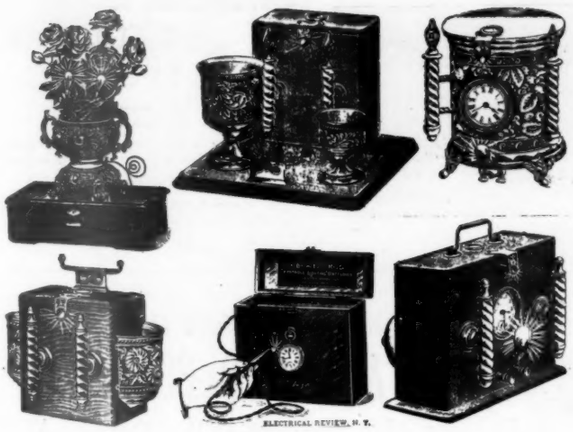

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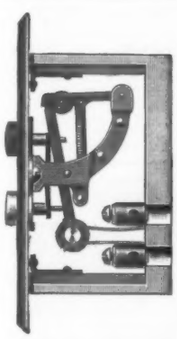

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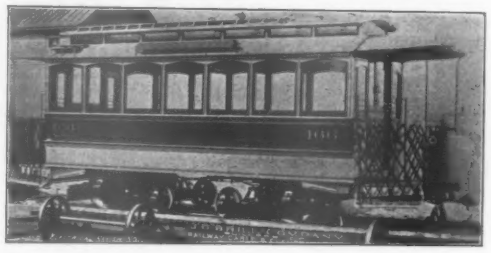

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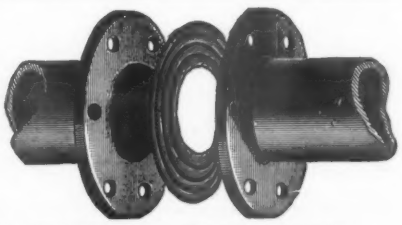

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